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highwater
CASCADE

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1 About Highwater Cascade

1.1 OVERVIEW

Highwater Cascade is a PostScript 3, PDF 1.7 and TIFF compatible software RIP, designed for high speed and high quality devices like imagesetters or platesetters, as well as for inkjet and laser printers or any other raster printing devices. Unlike other RIP's, all Cascade's features are written into the core software, eliminating the potential conflicts which exist in many plug-in workflow solutions.

Cascade is based on the GhostScript PostScript/PDF engine from Artifex Software Inc., but uses its own high speed rendering modules.

1.2 THE AIM OF CASCADE

Cascade is a high quality, comfortable and powerful pre-press workflow integrated into one interface. The designers of Cascade had the special intention to:

- **Create an intuitive, easy to use, very visual interface,** similar to the DTP applications that the designers are familiar with, allowing jobs to be previewed at all levels of processing (separations, composite, imposition, media).
- **Integrate all workflow tasks into the same interface.** All different tasks (job processing and management, previewing, imposition, proofing, imaging, history) are integrated into one interface, where each can be interacted with and managed from.
- **Keep the architecture flexible.** Cascade can be used in small pre-press studios as single-computer and single-engine installations, as well as in large publishing houses as multi-computer and multi-engine installations, where various departments have to control the workflow.
- **Offer full control.** While various components of Cascade can be installed in various places of the building, designers and operators have full control of the whole workflow process from their workstations.
- **Provide accurate color preview with continuous zoom.** This type of preview is orders of magnitude more useful than the current capabilities of popular alternatives to Cascade: two levels of magnification (microscopic and full page), and output colored with over-bright inks without color management.
- **Match or surpass the speed and quality** of the state-of-the-art in the RIP market, offering several screening types that can be fine tuned for the special needs of each customer.

1.3 FEATURES OF CASCADE

- **Compatibility:** Cascade is designed for compatibility with Adobe's cutting edge imaging technologies: PostScript 3 and PDF 1.7.
- **Film saving:** Saves potentially wasted material by automatically rotating and collecting the pages to minimize the media usage.
- **Remote operation:** Control of the rip on the desktop of every designer or operator. As the server application has no visual interface (it is an icon in the system tray), the client application has full control over the RIP through any network connection.
- **Built-in imposition:** User definable styles, manual and automatic page arrangement, user definable pre-press marks, bleed.
- **Built-in proofing:** Dot for dot and contone proofing systems, simulating line screens up to 200 lpi (dot for dot) or offering perfectly smooth output (contone) with good color accuracy (typically average $\Delta E < 2$).
- **Ink duct control:** Prints a diagram or exports a PPF or JDF file to control the ink ducts of the printing press.
- **Trapping:** Based on a raster based proprietary technology, Cascade trapping offers high quality shapes (excellent behavior in junctions, in the proximity of a third color, and with slightly different colors), speed and stability (due to the fast raster based algorithm), and features like auto-choke of blacks. spot color traps, special ink handling, narrowed/proportional traps, mitered traps, feathered and anamorphic traps etc.
- **Enhanced preview:** Any job can be previewed at different levels (separations, composite, imposition, media), using ICC-based color management (press and monitor ICC profiles supported) and continuous zoom.
- **High speed:** Cascade is one of the fastest rips available, several times faster than the majority of rips on the market.
- **Simultaneous operation:** Several designers or operators can work simultaneously with Cascade, by connecting as many client applications as necessary to the server.
- **Flexible output:** Cascade is designed to work with imagesetters, CTPs and inkjet printers. It can use the Cascade EtherSetter interface or interface boards with imagesetters, and the TIFF output can be used in conjunction with many CTP systems.
- **Multiple outputs:** Cascade can drive multiple output devices simultaneously.
- **Flexo friendly:** Flexo distortion and flexo screens built in. Flexo printers can work with Cascade simply and easily, without the need for extra programs.
- **Consistent rosettes:** Our unique screening technique achieves consistent rosettes with a pleasant look even in very adverse conditions (large page, low resolution, high line screen, flexography angles).
- **Extra gray levels:** Smooth gradients are guaranteed even on engines with serious technology limitations by using more than 4000 gray levels on almost any resolution/frequency combinations.
- **Excellent color stability:** Highlights and shadows are protected by our hybrid screening method: instead of using dot sizes below a certain (user definable) limit, the dots are stochastically removed.
- **Low-pass filtering:** Using more than 4000 shades of grays is not enough for perfectly smooth gradients, because high dot gain causes linearity problems even after calibration; using a stochastic technique, Cascade can filter out the linearity problems, offering pleasant, smooth gradients even on old capstan imagesetters.
- **Protecting skin tones:** Using a yellow screen of 30°, magenta and yellow screens will not produce moiré at all.
- **Stochastic screening:** A high quality second order stochastic screening technique offers smooth tints with no graininess on individual films, and moiré free results on color jobs.
- **User-friendly interface:** Cascade's interface is easy to understand and simple to use. The intuitive, attractive and simple interface gives a true Windows Vista/Windows 7 or XP look, feel and comfort (with object trees, lists, dockers and drag & drop).

1.4 SYSTEM REQUIREMENTS

1.4.1 Cascade Server

Recommended system requirements:

- Windows 7, Vista or XP (or newer) for PC clients only,
- Windows 2003 Server (or newer) for PC and Mac clients,
- Intel Pentium 4 on 2.4 GHz or newer,
- 2 GB RAM,
- 100 GB HDD hard disk space,
- Internet connection (for optional over-the-net remote client connections).

Minimum system requirements:

- Windows 7, Vista, XP, 2003 or 2000 (or newer),
- Intel Pentium 4, or compatible MMX command set,

- 1 GB RAM,
- 10 GB HDD,
- Network or Internet connection for remote clients.

1.4.2 Cascade Client

Recommended system requirements:

- Windows 7, Vista or XP (or newer),
- Intel Pentium 4,
- 1 GB RAM,
- 1280 × 960 × 16M resolution,
- 100 Mbps network connection (or faster),
- Internet connection (for optional over-the-net remote client connection).

Minimum system requirements:

- Windows 7, Vista, XP, 2000 or 2003 (or newer)
- Intel Pentium,
- 512 MB RAM,
- 1024 × 768 × 64K video resolution,
- Network or Internet link to the server (usable over dial-up).

1.4.3 Cascade Client on Mac

Recommended system requirements:

- Mac OSX 10.3.2 Panther (or newer),
- 1280 × 960 × 16M video resolution,
- 100 Mbps network connection (or faster),
- Remote Desktop Connection for Mac (free software),
- Internet connection (for optional over-the-net remote client connection).

Minimum system requirements:

- Mac OSX 10.4 (or newer),
- 1024 × 768 × 16M video resolution,
- Remote Desktop Connection for Mac (free software),
- Network or Internet link to the server.

Note: Macs running OS 9 or earlier have full printing ability to the Cascade, however they cannot control it remotely using the Cascade Client.

2 Installation

2.1 BASIC CONCEPTS

For performing a simple installation without understanding the Cascade architecture or configuring the network or imagesetter, go to section *2.2.8 Installing Cascade ‹page 16›*. However, before installation, a general understanding of Cascade architecture is recommended. This is beneficial because the real power of the Cascade is only fully realized when it is configured to work in a network.

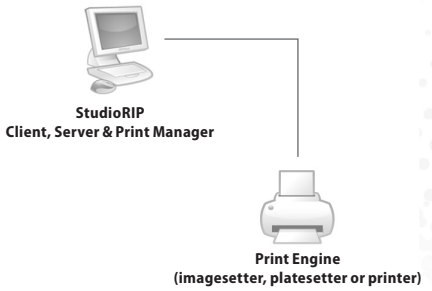
The Cascade package consists of three separate programs (i.e. executables):

- **Server,** which does the actual processing work of the system,
- **Print manager,** which interfaces with the print engines,
- **Client,** which is the visual user interface for the system.

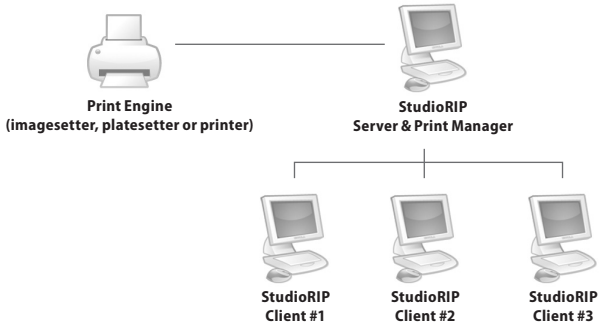
One, and only one, Cascade Server should be installed per site; it is the server that carries the license (dongle). More than one Print manager can be installed (one for each print engine driven by Cascade); and finally, multiple Clients can be installed, possibly one on each workstation, the number determined by the number of simultaneous operators desired at the site. The three programs of Cascade are separate units (executables), therefore each can be installed on its own separate computer, or they may be grouped in any combination desired. If the Cascade units are located on separate computers, the communication between them is done through the network connection linking the machines.

Some possible scenarios for installing the Cascade system are illustrated here:

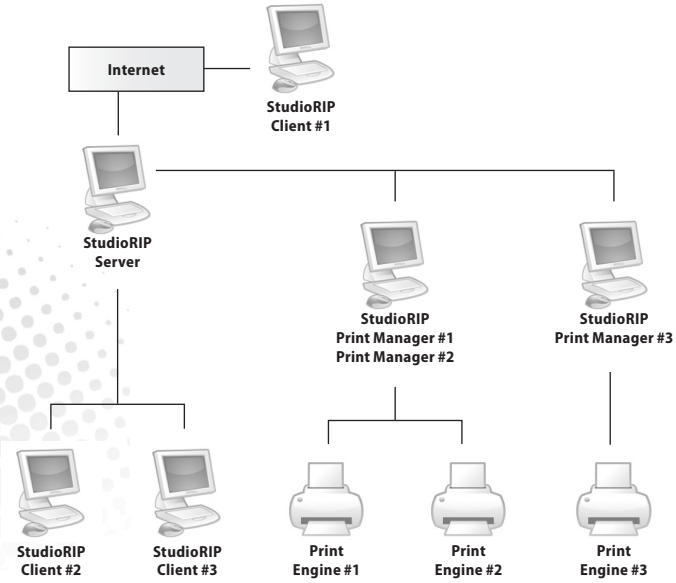
- **Basic configuration:** the Client, Server and Print manager all run on the same computer, and the print engine is connected directly to this computer.



- **Recommended configuration:** there is a dedicated computer for the server application, but the clients are placed on different workstations and connect through the network with it. In this scenario each workstation is running a copy of the client, giving each operator full control over the RIP and the jobs they are sending to it. The Print manager is running on the same machine as the Server.



- **Advanced configuration:** more than one Print manager is installed, possibly more than one per computer (each Print manager has to be running on the computer where the interface card is installed for the print engine connected to it, unless using EtherSetter interfaces which communicate through a network interface); clients, in addition to the regular intranet network connections, can connect over the internet also.



2.2 PERFORMING THE INSTALLATION

Having planned the Cascade system, start installing the appropriate parts on the computers. The recommended installation order is:

- Configure your network so that the different parts of Cascade can communicate with each other (on a typical intranet LAN no modifications are necessary),
- Install the interface board (if any),
- Connect up the EtherSetter box (if any),
- Ensure that the 3rd party TIFF catcher of the engine is running and configured (if any),
- Set up the print engine for the connection with Cascade (including any Windows drivers and Windows printer ports),
- Install the Print manager(s) (if it will be running on different computers than the Server),
- Install the Cascade Server (together with the Print manager and Client, if they will run on the same computer),
- Plug in the hard key (dongle),
- Set up the print engine on the first launch of the Print manager (the installation process will automatically prompt the user to do so),
- Install the Cascade Clients on all workstations where needed,
- Set up the printer profiles and job styles on the first launch of a Client (the installation process will automatically prompt the user to do these).

2.2.1 Setting up the print engine

Some print engines require configuration to enable proper communication with EtherSetter, Highwater or SCSI interface. Refer to the user manuals of these print engines to verify or set the following:

- **Agfa (EtherSetter, PciAPIS, Highwater):** no settings required.
- **Ultre (Highwater):** no settings required.
- **Linotronic (EtherSetter, Highwater):**
  - LI2 set up to 8/16 MHz Clock, Sender Master, Receiver Clock, By panel and LI5;
  - LI5 set up to 9600 baud, 8 bits, no parity, CTS/RTS.

- **Scangraphic (Highwater):**
  - for HW772 or HW972, LI5 set up to 9600 baud, 8 bits, no parity, XON/XOFF;
  - for HW773 or HW973, set Data Input mode = FPI.
- **ECRM (EtherSetter, Highwater, SCSI):**
  - Mako & Knockout series: Serial mode set to Overscan Mode = OFF → Image Offset = 100 units, Overscan Mode = ON → Image Offset = 300 units;
  - VR series with firmware v2.2.1 or newer: Interface set to Serial;
  - VR series with firmware under v2.2.1 (Highwater only): Interface set to Remote, then HasSerial parameter in the appropriate file in the Cascade\HW folder set to 0.
- **EXXTRA:**
  - for HW774 or HW974 boards set Any Stop/Start mode except Controlled Backup;
  - for HW775 or HW975 boards set Stop/Start in Controlled Backup mode only.
- **Canon BX/JX:** Printer must have Canon buffer card installed;
- **Scitex Dolev:** see ‹*page 11*› in the Pci Plugin User Guide manual provided by HighWater in PDF format on the installation CD.

2.2.2 Installing an EtherSetter box

See section *7.3 EtherSetter interfaces ‹page 77›* for more information on configuring EtherSetters.

- Connect the cable from the engine (imagesetter, CTP) to the EtherSetter.
- Connect the network cable to the EtherSetter (either through a network switch or directly from the LAN adapter of a PC).
- Turn on the engine and wait for it to boot.
- Connect the power cable to the EtherSetter. The power LED should light immediately and the Ready LED should start flashing.
- When the EtherSetter finished booting, after about 1 minute, the Ready LED should light.
- Now the EtherSetter will establish communication with the imagesetter and having succeeded will light the Engine link LED.
- Assuming the Cascade has been installed on your PC (see *2.2.8 Installing Cascade ‹page 16›* below), start the Print Manager for the first time. A wizard will appear to allow you to choose your imagesetter from the list of available devices. Choose the driver, for example EtherAPIS (for Agfa) or EtherLino (for Linotronic).
- Once the Print manager is running, the PC link LED on the EtherSetter should light. If immediate communication is not established the first time, try rebooting the EtherSetter and restarting the Print manager. For non-standard networks it may be necessary to configure the EtherSetter manually, see *7.3 EtherSetter interfaces ‹page 77›* for details.

2.2.3 Legacy systems with interface boards

Fit the engine interface card into the PC that will connect to the print engine. Connect and start the print engine, then start the PC. It should say that it has ‘Found new hardware’. Point it to the appropriate driver on the install CD or folder:

- for a Cascade PciAPIS interface card, the driver is in the *Drivers\PciAPIS folder,*
- for a Highwater Designs Ltd PCI interface card, the driver is in the *Drivers\HighWater* folder.

2.2.4 Connecting to a third party TIFF catcher

In this scenario the Print manager will not be used to drive the engine and will not be installed.

- Ensure that the TIFF catcher is running and that its input hotfolder is shared, write privileges have been granted and that it is accessible to the PC running Cascade Server.
- In case of a networked TIFF catcher, try whether the network path of the hot folder is visible and writable from the PC running Cascade Server. For example, enter the network path (e.g. *\\TiffCatcher\HotFolder*) into a Windows Explorer window, and check whether files can be copied into the hot folder.
- Write down the tested network path, and use it in the *Add print engine wizard,* see *3.1.3 Starting the Client for the first time ‹page 23›*.

2.2.5 Setting up the network

In most cases, Cascade installation will require no special configuration of the existing computer network. However, in special cases (interconnected networks, clients connecting from the internet into a firewalled intranet), the

network administrator will find the information below useful to configure the local network for Cascade compatibility.

There are two communication channels that Cascade uses between its components:

- The Client(s) connects to the Server, by default, through TCP port 4024, therefore the computer running the Server has to expose port 4024 to incoming connections. The port number can be modified to a new setting, applied to both the Server and the Client. If this setting does not match on Server and Client, communication is not possible.
- Cascade Server connects to the Print manager(s) normally through TCP port 4025, but if 2 or more Print manager applications are running on the same PC, further TCP ports will be used (with port numbers assigned incrementally from 4025, i.e. 4026, 4027, etc.). Therefore any computer running a copy of Print manager has to expose port 4025 (and 4026, 4027, etc, whichever apply) to incoming connections.

It is important that these TCP channels are open between the Clients, the Server, and the Print managers. On a typical internal LAN network, all ports are freely accessible on all machines on the network, therefore no special configuration is necessary. If there are firewalls or other obstacles in the system that could obstruct access to these ports, remove them or configure them properly. Software protecting individual PCs from outside attack, such as the Windows Firewall built into Windows XP by Microsoft and ZoneAlarm by ZoneLabs will block the ports required by Cascade, and they will have to be configured to allow communication through the above listed ports.

If access to the Cascade system from the Internet is required, TCP port 4024 has to be opened (and forwarded, if the computer does not have a public IP address), to give the Clients access.

2.2.6 Connecting from the Internet to a Cascade Server

If the PC running the Server has a public IP address, then opening port 4024 on the firewall protecting the network should be sufficient to allow access. If opening port 4024 proves impossible for some reason, change the TCP port used to some other commonly used port number (such as the ones used by HTTP, FTP, POP3 etc., which presumably are already open and no further network configuration will be necessary), on both the clients and on the server (on the server, modify the connection settings by right-clicking the server icon and entering the *Settings* menu).

If the Cascade Server has a local IP, the router has to be configured to forward TCP port 4024 on its public IP to the local IP address of the PC running the Cascade server.

Example: the device acting as a router has the public IP of 83.103.131.214, and the Cascade server is running on the PC with a local IP of 192.168.0.3. To achieve a connection, TCP port 4024 on the device with the public IP 80.103.131.214 has to be mapped to the TCP port on the PC with the local IP of 192.168.0.3. This will mean that the incoming connections for the Cascade server will be automatically redirected to the local PC which is actually running it.

If Clients are granted access via the Internet, use Cascade's password control (otherwise unauthorized people could take control of Cascade and the print engine). See *6.7 User management ‹page 68›* about how to protect Cascade with password control.

The Cascade Server cannot be accessed through a proxy server, only via direct TCP connection.

2.2.7 Installing the hard key

Cascade is protected by a USB hard key (dongle). The hard key protects only the Server application; it has to be installed on the computer that runs the Server. Do not plug the hard key in until after the Cascade has been installed, the hard key drivers will be installed with the Cascade.

A common problem with the hard key is that the USB ports are not installed properly in Windows (this happens quite often with USB 2.0 ports, which may require drivers from the install CD of the motherboard). If the hard key does not work correctly, carefully check that the USB port is working properly.

If the hard key is not installed, Cascade runs in Demo mode. In Demo mode all the functions of Cascade will work properly, but the text *Cascade DEMO* and a link to the RIP's website will be printed all over the pages.

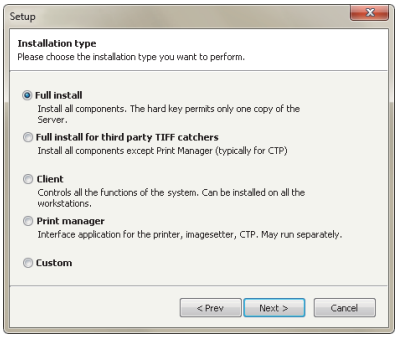
2.2.8 Installing Cascade

The Cascade setup program will have to be run on each PC that will have any Cascade components installed on it. Within the setup program the user can select which components to install on any given machine. The setup choices are explained below.

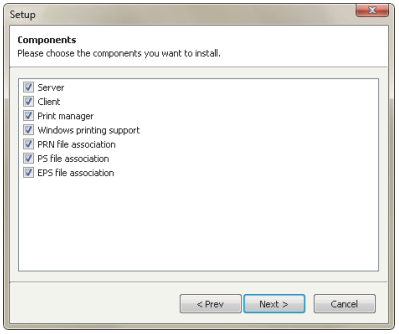
Insert the Cascade setup CD. It will automatically launch the setup pro-

gram. The installation can also be started manually by running Setup.exe from the setup folder.

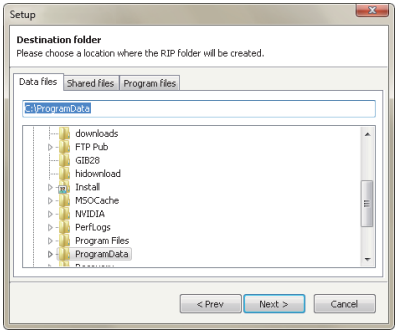
- Before launching the installer, a small dialog box will ask for the language to use. It is defaulted to match the language setting of the operating system.
- **Step 1:** Choose which installation type to perform. The options are self explanatory. A common mistake is to choose full install when a third party TIFF catcher is used – pay attention to chosing the right option.


Setup
Installation type
Please choose the installation type you want to perform.
Full install
Install all components. The hard key permits only one copy of the Server.
Full install for third party TIFF catchers
Install all components except Print Manager (typically for CTP)
Client
Controls all the functions of the system. Can be installed on all the workstations.
Print manager
Interface application for the printer, imagesetter, CTP. May run separately.
Custom
< Prev
Next >
Cancel

- **Step 2:** if custom install has been chosen, select which parts of the program to install. Here the user can decide whether the three files types (PRN, PS and EPS) will be associated with the Cascade.



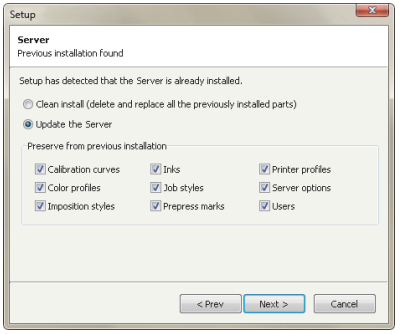
- **Step 3:** choose the destination folder where Cascade will install the executables, the data folders and the shared (public) folders. The data files of Cascade may intensively use the HDD space (depending on the Print manager settings), so if the default drive pointed to by the operating system isn't large enough, choose a different location. It is recommended though to keep the program files at their default location.



Changing the file locations of an existing installation can be done by running the Setup and specifying the new location. The data files from the old location will be safely moved into the new location.

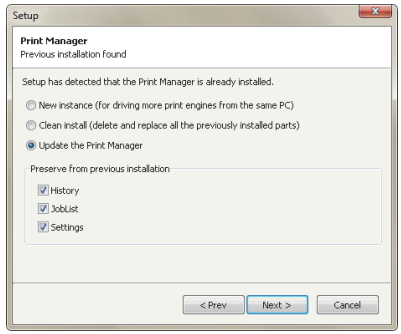
Cascade will need large areas of HDD space for storing the 1-bit files. If your PC has multiple drives or the HDD has multiple partitions, choose the biggest one for the data files.

Step 4: if this installation is a re-install or an upgrade of the Server, choose whether to perform a clean install, or to keep some of the old settings.

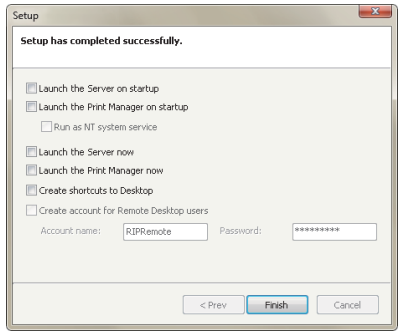


- **Step 5:** if a previous install of the Print manager is detected, three choices will be offered. **1.** Installing a new instance (for systems with more than one print engine connected to the same computer). **2.** Perform a

clean install, or, **3.** For re-installations and upgrades, keeping some of the settings of the previously installed Print manager.


Setup
Print Manager
Previous installation found
Setup has detected that the Print Manager is already installed.
New instance (for driving more print engines from the same PC)
Clean install (delete and replace all the previously installed parts)
Update the Print Manager
Preserve from previous installation
History
JobList
Settings
< Prev
Next >
Cancel

- **Step 6:** after the Setup program performs the installation, there are a number of choices:
  - Set up the automatic launch of the server applications on startup; this is recommended for simple XP installations;
  - Register the server applications as system services; this is recommended only for Mac clients using Windows Server 2003 (or newer), and will start the server applications without a user logon; however, the tray icons will not appear anymore, and manually starting/stopping the applications will be more complicated (they can be started/stopped from the Services application of Windows);
  - Create NT user accounts for the Terminal Services users (this is obligatory for Mac Clients), specifying the account name and password. Note: a blank password is not acceptable for a Terminal Services account.



- **Step 7:** If the two 'Launch now' boxes are ticked, the Server and Print manager will start immediately. On first startup, the *Print engine setup wizard* will open; follow the instructions in section *3.1.1 Starting Print manager for the first time ‹page 21›*.

2.3 INSTALLING CLIENTS

2.3.1 Installing PC clients

Multiple copies of the Clients can be installed within the network, one on each computer that may want to control the RIP. In most cases any workstation on the network will require the Client.

Normally the Cascade Client is automatically installed as part of a full install (together with the Server and Print manager). However, on workstations it will have to be installed separately. Installing Cascade Client is extremely easy: start the Cascade setup program and choose the *Cascade Client* option under Step 1 of the installation procedure.

The Cascade Client application is not just a remote visualization of the server window; it is actually a completely independent program that communicates with the server. If two or more Clients are connected to the server, each can act independently, previewing different jobs, for example. The only clue that another Client is also connected to the Server is that sometimes jobs will be started, stopped, modified etc. So a design studio with designers at 10-20 workstations can install the Client on each of the workstations. Each designer will be able to control the whole printing process, viewing their own or others' jobs from their workstations.

2.3.2 Installing Mac Clients

Cascade Client cannot run natively on a Macintosh workstation. Therefore a special setup is used for Mac workstations, which results in providing the full functionality of Cascade Client on a Mac workstation. It is based on Microsoft's free *Remote Desktop Client for Mac* application, available for download on Microsoft's web page, and the Terminal Services Client licenses that are a feature of Windows servers. Extra Terminal Services Client licenses may have to be purchased from Microsoft to enable sufficient users.

This scenario requires that the Cascade Server is installed on a machine running Windows 2003 Server (or newer). This setup lets multiple Terminal Services clients connect remotely to the Windows server using the same account (dedicated to Cascade), but at the same time allows each client to see a different desktop and perform different work.

Note: Microsoft changed the name *Remote Desktops Clients* to *Terminal Services Clients* between Windows 2000 and Windows 2003. This leaves us with an application, which is installed and runs on the Macs, called Remote Desktop Client for Mac, and the licenses on the Windows 2003 server (necessary to run it) called Terminal Services Client licenses.
In order to let Mac clients control Cascade, follow the steps below:

- Install any extra Terminal Services Client licences that may be required on the Windows 2003 server.
- Install Cascade Server onto the Windows 2003 Server (or newer);
- Let the Setup register the server applications as system services;
- Let the Setup create an account for the Terminal Services user;
- Let the Setup launch the server applications;
- Finish installation and configuration of Print manager and Server;
- Reboot the system;
- Log in with the user name 'CascadeRemote' and 'studiorip' as the password (or with the login name and password specified by the network administrator);
- Perform all the first logon specific tasks (Windows tour, etc.), so that on the next logon they will not reappear;
- Optional: install a Mac theme (StyleXP with Panther or Tiger scheme is recommended); this will make Mac users feel comfortable with the windows they see on their workstation.
- Start the Cascade Client application from the menu icon that should be available in the Start menu. (If the Client is not able to connect to the server, then the Server is probably not running; check whether it was in fact installed as a system service.)
- Go to *Client Options* in the *Tools* menu;
- Check the *Launch on startup for this user account* box;
- We recommend the *Full screen (for Remote Desktop)* box is left checked;
- Close the Cascade Client and log off as CascadeRemote.
- Move to the Mac and perform the actions listed below.

On the Mac workstation:

- Install the *Remote Desktop Client for Mac* application (it is on the install CD in the *Mac\Remote desktop client for Mac* folder);
- Start it, and set it up with the following data:
  - Computer: IP or host name of the PC running the Server application;
  - User name: *CascadeRemote* (or the user name that was entered earlier instead of the default);
  - Password: *studiorip* (or the password that was entered earlier instead of the default);
  - Display size: full screen;
  - Add it to the keychain so that clicking on it will automatically start it with these settings.
- Create an alias of it on the Desktop or other convenient place.
- Connect to the Cascade Server PC by running the created alias.

Starting the Client with this alias will give full control of the Cascade Server, with one exception: when opening any kind of files, the file system visible will be the one of the Server PC which effectively runs the Client. Therefore, in this installation scenario, the Cascade port or the hot folder system will have to be used to print, rather than the Open command.

3 Getting started

3.1 STARTING FOR THE FIRST TIME

After the installation, when the server programs (Cascade Server and Print manager) are launched, their normal running state is shown by a system tray icon, as these programs don't have graphical interfaces (except a few dialogs). The user interface will be provided by the Cascade Client application.

The two server applications can be stopped by right-clicking their icons in the system tray and clicking Exit. They can be restarted using their Start menu or desktop icons.

If the servers are running as system services, the icons will not appear. Use the *Services* administrative tool to stop/start these programs. If settings changes are necessary, stop them and then restart them as regular applications.

On startup, the Server and Print manager will open their TCP ports to listen for incoming connections (port 4024 for Server and 4025 or higher for Print manager). Some operating systems (such as Windows XP SP2 with Windows Firewall enabled) or security applications will ask whether these programs should be allowed to open these ports.

Let the Cascade Server and Print manager open the TCP ports! Otherwise, they will not be able to work properly. If there are options available for permanently remember this setting, check them.

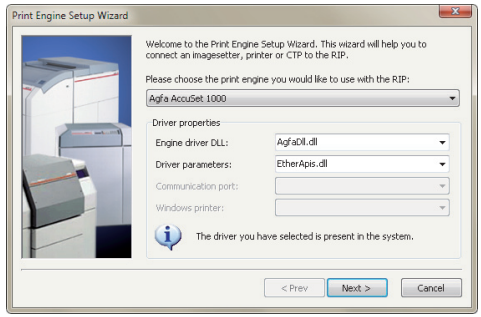
When Print manager is started for the first time, the *Print engine setup wizard* will be started. The next chapter describes how this wizard has to be completed.

3.1.1 Starting Print manager for the first time

When Cascade Print manager launches for the first time (and any other times it detects that no print engine is set up, or if the *Change print engine* menu item is selected), it starts the *Print engine setup wizard*. In this section, the term *print engine* refers to the physical device connected to the PC and that will produce the output.

Please select the print engine from the top drop down list. By choosing the print engine to be used with Cascade, the *Driver properties* box will be automatically filled in with the best choice. For example, if *Agfa AccuSet 1000* is

chosen, the choices will be either to drive it with the Cascade's EtherSetter box, PciAPIS board or HighWater's HW976 interface board. Cascade will detect which of these boards is present in the system, and will automatically select the correct one.


Print Engine Setup Wizard
Welcome to the Print Engine Setup Wizard. This wizard will help you to connect an imagesetter, printer or CTP to the RIP.
Please choose the print engine you would like to use with the RIP:
Agfa AccuSet 1000
Driver properties
Engine driver DLL:
AgfaDll.dll
Driver parameters:
EtherApis.dll
Communication port:
Windows printer:
The driver you have selected is present in the system.
< Prev
Next >
Cancel

If the interface board is not yet installed, the wizard will warn about it, but will not prevent completion of the setup process. Immediately after completion of the setup, the interface board should be fitted, in order to use Cascade.

If the print engine to be connected to Cascade uses a Windows communication port (typically an inkjet printer), choose the right port in the *Communication port* box. Normally this is straightforward, as the port name is similar to the engine name (e.g. *USB: HP DesignJet 130*), but it might be difficult if the name of the port has a generic name (e.g. *USB: USB2.0 Printer*).

In most cases the USB port used by Epson printers has the following name: USB: USB2.0 Printer (Hi-speed).

Devices using Windows communication ports can also be set to use the Windows print spooler. As a last resort, this option is always available: choose the right printer with the 'SPOOL:' prefix in the Communication port box. This is necessary when the use of the communication port is difficult or impossible (the print engine is connected through Ethernet, Fireware port etc., or the USB port is shared for other functions).

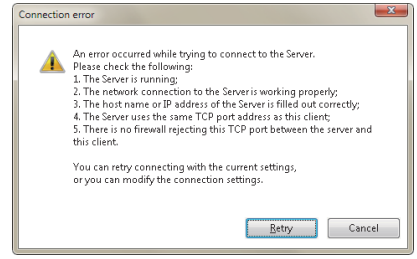
If the print engine to be connected to Cascade uses a Windows print spooler (i.e. it is a windows monochrome printer, such as a HP LaserJet 4000), the *Windows printer* box will become active, allowing the user to choose the printer.

Monochrome Windows printers can be driven using the *Windows monochrome printer* device, and then choosing the right printer from the list.

3.1.2 Connecting the Client

Once the Cascade Server and Print manager are running, the Cascade Client can be started on the local computer or on a workstation on the network:

- On the server PC, the Client can be started by its menu shortcuts (Start button → Programs menu → Cascade or Desktop icon) or by double-clicking on the Cascade Server icon in the system tray. The Client should start and connect to the Server without error messages.
- On a network workstation, the Client can be started by its menu shortcuts (Start button › Programs menu › Cascade or Desktop icon). The first time the client is run an error message will appear, because it will be unable to connect to the server on the local machine; click Cancel, which will bring up the *Connection settings* dialog box. Fill out the box (normally only the IP address of the server has to be entered), then click OK. See section *6.9.2 Connection settings ‹page 70›* for more details about the connection settings dialog box.

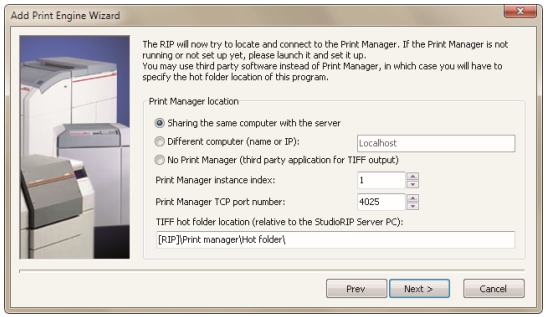

Connection error
An error occurred while trying to connect to the Server.
Please check the following:
1. The Server is running;
2. The network connection to the Server is working properly;
3. The host name or IP address of the Server is filled out correctly;
4. The Server uses the same TCP port address as this client;
5. There is no firewall rejecting this TCP port between the server and this client.
You can retry connecting with the current settings, or you can modify the connection settings.
Retry
Cancel

If Cascade Client fails to connect to the Server, the Server is verifiably running, and the hostname or IP address was entered correctly, then there may be a firewall between the Client and Server. See section *2.2.5 Setting up the network ‹page 15›* for further details.

Antivirus, firewall or other protection software often causes connection problems between the Client and Server. Connection failure or blocked communication after a successful connection can both be caused by such software.

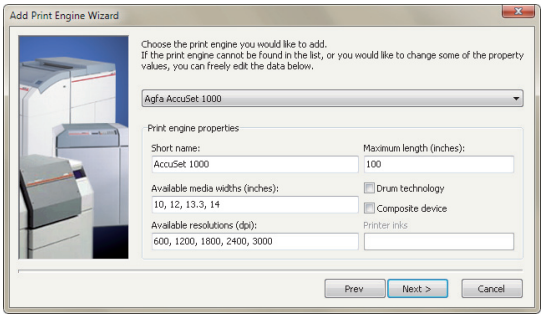
3.1.3 Starting the Client for the first time

If the Client successfully connected to the Server, the *Add print engine wizard* will be launched automatically for first-time configuration. This wizard can also be launched manually at some later time from the *File* menu. As the print engine is already set up in the Print manager, the client will first try to connect to the Print manager and to acquire the print engine information. Therefore the Print manager should already be set up and running at this point (except in the case when a third-party TIFF catcher application will be used instead of the Print manager).


Add Print Engine Wizard
The RIP will now try to locate and connect to the Print Manager. If the Print Manager is not running or not set up yet, please launch it and set it up.
You may use third party software instead of Print Manager, in which case you will have to specify the hot folder location of this program.
Print Manager location
Sharing the same computer with the server
Different computer (name or IP):
Localhost
No Print Manager (third party application for TIFF output)
Print Manager instance index:
1
Print Manager TCP port number:
4025
TIFF hot folder location (relative to the StudioRIP Server PC):
[RIP]\Print manager\Hot Folder\
Prev
Next >
Cancel

The following choices are available:

- **Sharing the same computer with the server:** for default setup (one Print manager installed on the same PC as the Server); no additional settings are needed.
- **Different computer (name or IP):** if the Print manager is on a different computer than the Server application, it will be necessary to specify the IP number or host name of that computer.
- **No Print manager (third party application for TIFF output):** if connecting through a third party TIFF catcher application to the print engine, select *No Print manager,* and fill out the hot folder location of the TIFF catcher. The *[Cascade]* section in the path string will be replaced by the Server application to the path of the Cascade data folder.
- **Print manager instance index:** if more than one Print manager application is running on the same PC, it will be necessary to specify its instance index (1 for the first one, 2 for the second one, and so on). Changing the index will also modify the port number and the hot folder location automatically.
- **Print manager TCP port number:** normally it is automatically changed together with the *Print manager instance index* setting, change it manually only if a special setup is needed.
- **TIFF hot folder location:** the path of the hot folder expecting the TIFF files generated by Cascade. Normally the folder name is automatically changed together with the *Print manager instance index* setting. If Print manager runs on a network computer, the share name of the hot folder needs to be entered here, see *7.2.1 Installing Print manager on another computer ‹page 76›.* If Cascade will be connected to a third party TIFF catcher, the path of the hot folder needs to be entered here.

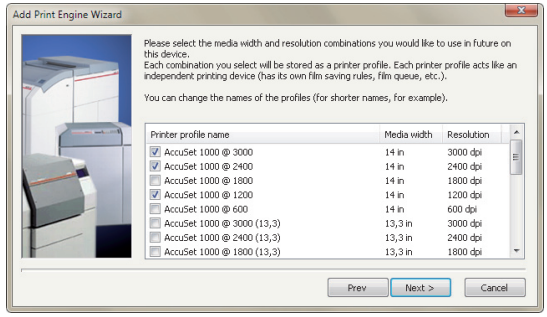

Add Print Engine Wizard
Choose the print engine you would like to add.
If the print engine cannot be found in the list, or you would like to change some of the property values, you can freely edit the data below.
Agfa AccuSet 1000
Print engine properties
Short name:
AccuSet 1000
Maximum length (inches):
100
Available media widths (inches):
10, 12, 13.3, 14
Drum technology
Composite device
Available resolutions (dpi):
600, 1200, 1800, 2400, 3000
Printer inks
Prev
Next >
Cancel

The hot folder location is relative to the Server. It may be easier to run the Client on the Server PC for this setup, to avoid confusion.

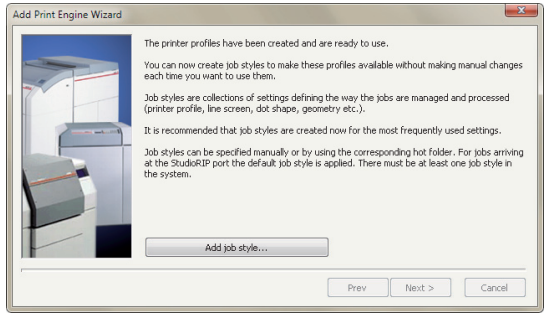
- If the connection to the Print manager has succeeded, the print engine information will be retrieved and filled in automatically. If a third party TIFF catching application is being used, the engine type will have to be specified at this point;
- Print engine properties can also be modified manually, or a custom print engine can be created by filling out the fields;
- Most of the fields are self explanatory;
- The *Composite device* field specifies whether the print engine is color (e.g. inkjet printer) or monochrome (e.g. CTP, imagesetter, laser printer). Note that composite devices may be used as monochrome, for example inkjet printers with inkjet films, in which case this field needs to be unchecked.
- The *Printer inks* field specifies the inks (colorants) used by the composite device (on certain models, in a specific order). Each colorant is described by one of the following characters: *C, M, Y, K, c, m, y, k* or *l*. For example, *KCMYcm* means that the printer has black, cyan, magenta,

yellow, light cyan and light magenta colorants, and it expects the printing information to arrive in this order.

- The wizard will automatically create profiles for the resolutions and media sizes selected in the window; check only the combinations that are necessary, thereby avoiding overcrowded controls later;


Add Print Engine Wizard
Please select the media width and resolution combinations you would like to use in future on this device.
Each combination you select will be stored as a printer profile. Each printer profile acts like an independent printing device (has its own film saving rules, film queue, etc.).
You can change the names of the profiles (for shorter names, for example).
Printer profile name
Media width
Resolution
AccuSet 1000 @ 3000
14 in
3000 dpi
AccuSet 1000 @ 2400
14 in
2400 dpi
AccuSet 1000 @ 1800
14 in
1800 dpi
AccuSet 1000 @ 1200
14 in
1200 dpi
AccuSet 1000 @ 600
14 in
600 dpi
AccuSet 1000 @ 3000 (13,3)
13,3 in
3000 dpi
AccuSet 1000 @ 2400 (13,3)
13,3 in
2400 dpi
AccuSet 1000 @ 1800 (13,3)
13,3 in
1800 dpi
Prev
Next >
Cancel

- Once the printer profiles have been successfully created, at least one job style must be created (only then will the Next button be enabled). See chapter *6.2 Job styles ‹page 50›* for further details.


Add Print Engine Wizard
The printer profiles have been created and are ready to use.
You can now create job styles to make these profiles available without making manual changes each time you want to use them.
Job styles are collections of settings defining the way the jobs are managed and processed (printer profile, line screen, dot shape, geometry etc.).
It is recommended that job styles are created now for the most frequently used settings.
Job styles can be specified manually or by using the corresponding hot folder. For jobs arriving at the StudioRIP port the default job style is applied. There must be at least one job style in the system.
Add job style...
Prev
Next >
Cancel

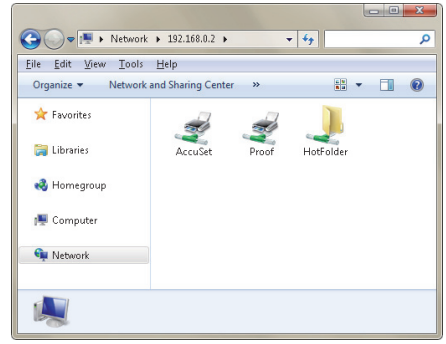
3.2 SETTING UP THE NETWORK PRINTERS

3.2.1 Setting up network printers on PC

Cascade will automatically create a Windows printer for each job style created (these printers can then be used from any Windows application). This behavior can be turned off by checking the *Create printer only for the default job style* box in the *Tools → Server options* dialog. The printers that are created will also be shared over the network, unless the *Share the created printers* box is unchecked.

The share name of printers can be edited in the properties of each job style (see *6.2 Job styles ‹page 50›*). It is recommended that short share names are chosen if workstations running Mac or older Windows systems are to be connected.

Unless the operating system or a firewall is blocking them, the shared printers should be visible from the workstations. (Depending on which operating system is being used, look in either *Network Neighborhood* or *My Network Places* and search for the server PC.) By right-clicking on its icon and choosing *Connect*, the drivers will be installed on the local PC, and a local printer will be created and connected to the shared printer on the server.



Note: Windows XP or newer systems may detect and install the shared network printers automatically. These will appear in the *Printers and faxes* window of the workstations. In this case manual installation will not be necessary.

Once the network printers are installed on the workstation, they can be used just like any other network printers, and all the jobs sent to them will be captured by the Cascade Server application.

3.2.2 Setting up network printers on Mac

Mac workstations using OSX can use the shared network printers without modification. Use the *Add printer* utility to connect to the printer. Mac workstations using Mac OS 9 or earlier can also connect without modification if the Cascade Server is running on a PC with an NT Server OS (e.g. Windows 2003 Server), provided this has services for Macs installed (file and printer sharing). Neither of these cases needs third party applications.

With Mac OS 9 running on the Mac workstations and XP (or other non-server OS) on the server PC, Miramar PC MacLan or other third party software will be needed.

3.3 SETTING UP THE HOT FOLDERS

Using the hot folder system is a fast and easy way to send previously created PDF or PS files from the workstations. It is the only practical way to do it from a Mac workstation (where the Open command of the Client sees the file system of the server PC rather than of the workstation).

The working principle of the hot folder is the following: there is a root hot folder (located in the folder specified during the installation as *Shared folders*, on XP systems the default is *C:\Documents and Settings\All Users\Documents\Cascade\HotFolder,* and on Vista systems the default is *C:\Users\Public\Documents\Cascade\HotFolder*), containing one folder for each job style, and bearing the same name as the job style. If files are dropped into these hot folders, the files will be processed, following the rules below:

- Files dropped into the root folder or into a subfolder which does not have a job style with the same name, will be processed using the default job style;
- Files dropped into a subfolder, bearing the same name as a job style, will be processed using the appropriate job style.
- Files dropped into a sub-subfolder (bearing the same name as a job style) of a subfolder (bearing the same name as a job style group), will be processed using the appropriate job style group and job style combination.

For example, if two job styles are being used named *170 lpi offset* and a *150 lpi flexo*, shortcuts can be created on the desktop to these two hot folders (created automatically by the Cascade in the root hot folder), and then any files dropped into these shortcuts will go to the appropriate job style.

3.3.1 Setting up the hot folders on a PC

On a PC, setting up the hot folders is done by a one-button click in the Client:

- Start the Client application and connect it to the Server,
- Go to the *Job styles* window,
- Highlight the job style to create a hot folder for,
- Press the *Create shortcut* button.

The shortcut to the hot folder will be created on the desktop. It can be moved if necessary.

3.3.2 Setting up the hot folders on Mac running OSX

First create any shortcuts on a PC (if there is no other PCs in the network, launch the Client on the server and create the shortcuts there). This will force the hot folders to be shared on the network (a folder named *HotFolder* will appear when browsing the Server from the network).

On the Mac: Use 'Go → Connect to Server', then browse to find the Cascade Server PC and its hot folder. Mount *HotFolder* and/or its subfolders. Each job style has its corresponding subfolder, bearing the same name. You may want to add aliases to these folders on the Desktop.

3.3.3 Setting up the hot folders on a Mac running OS 9 or earlier

Using PC Maclan the subfolders of the hot folder (job styles) must first be shared on the Cascade server PC. (This is not the same as the built-in Windows sharing.) Right-mouse click on the folder to be shared, and select *Appletalk sharing*. Moving to the Mac: In the Chooser select Appleshare. The Cascade server PC (running Maclan) should be visible. Highlight it and click OK.

The shared folders will now be listed. Select the correct folders from the list (ticking *Connect at startup* to avoid doing this every time the Mac is restarted). Each selected folder will now appear as a desktop icon.

4 Finding your way around Cascade

The entire Cascade system is controlled by the Client application(s), which exhibit the integrated graphical user interface of the Cascade Server and Print manager applications. This chapter will present the Client application.

4.1 THE MAIN WINDOW

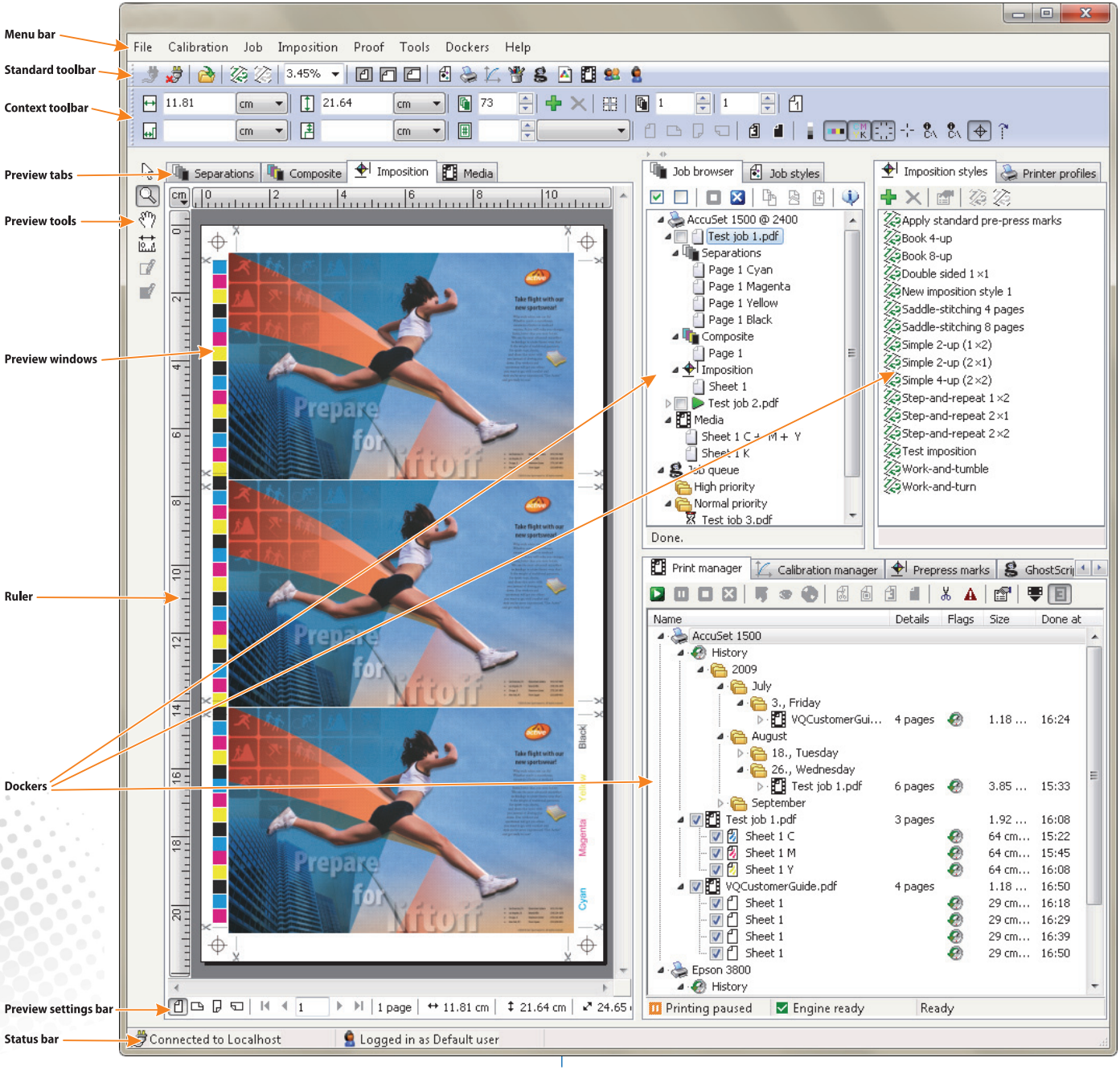
As shown on the picture on the next page, the main window contains the following controls:

- Menu bar, located at the top of the main window,
- Standard toolbar, located under the menu bar, containing buttons for common operations, such as *Open*,
- Context toolbar, changing its contents depending on the current view (separations, composite, imposition, media),
- Four preview windows for the four views; the view can be changed by the tabs at the top of the windows,
- Four preview tools to the left of the preview windows,
- Preview settings bar under the preview windows,
- Three holders for dockers (customizable),
- Two buttons (*Hide/show dockers* and *Auto-hide dockers*) controlling the behavior of the docker panel, *see 4.2.7 Dockers menu ‹page 30›.*
- Status bar at the bottom of the window.

4.2 MENU ITEMS

4.2.1 File menu

- **Connect:** will connect the Client to the Server. Normally does not have to be used, because the Client connects automatically on startup. It is useful when the connection was lost for some reason and manual reconnection is necessary.
- **Disconnect:** disconnects the Client from the Server.
- **Open:** opens a PostScript, EPS, PDF, JPEG, BMP or TIFF file for processing. The opened file will be uploaded to the Server through the TCP communication channel, and processed.
- **Add print engine wizard:** starts the *Add print engine wizard*. See section *3.1.3 Starting the Client for the first time ‹page 23›* for more details.
- **New job style:** adds a new job style by showing the *Job style* window. See section *6.2 Job styles ‹page 50›* for more details.


Menu bar
Standard toolbar
Context toolbar
Preview tabs
Preview tools
Preview windows
Ruler
Dockers
Preview settings bar
Status bar
File Calibration Job Imposition Proof Tools Dockers Help
Separations Composite Imposition Media
Job browser Job styles
Imposition styles Printer profiles
Print manager Calibration manager Prepress marks
Connected to Localhost
Logged in as Default user

- **Job styles:** shows the *Job styles* (docker) window. This window manages the available job styles in the Cascade system. If this window is docked to a holder, it will be brought to the foreground. See section *6.2 Job styles ‹page 50›* for more information.
- **Printer profiles:** shows the *Printer profiles* (docker) window. This window manages the available printer profiles in the Cascade system. If this window is docked to a holder, it will be brought to the foreground. See section *6.1 Printer profiles ‹page 45›* for more information.
- **Upgrade license:** opens the *License upgrade* window. This window allows the on-site update of Cascade. Contact your local dealer for more details on enabling currently disabled features.
- **Show licenses:** opens the License window. This window shows the options enabled on the hard key, and therefore available with the current Cascade license. Contact your local dealer for more details on enabling currently disabled features.
- **Exit:** quits Cascade client only. The Server will still be running, and other users will be able to work through other connected Clients.

4.2.2 Calibration menu

- **New calibration curve:** creates a new calibration curve by showing the *Calibration curve editor* window. See section *6.4.4 Calibration curve editor ‹page 64›* for details.
- **Print calibration page:** opens the *Print calibration page* window, used for printing calibrated or un-calibrated test pages. These pages can then be measured with a densitometer to create or check calibration curves. See section *6.4.2 Print calibration page ‹page 63›* for further details.
- **Dot gain compensation:** opens the *Dot gain compensation* window, used for adjusting the dot gain of the printing press to match an ICC profile. See section *6.5 Dot gain compensation ‹page 65›*.
- **Calibration manager:** shows the *Calibration manager* (docker) window. This window manages the available calibration files in the Cascade system. If this window is docked to a holder, it will be brought to the foreground. See section *6.4.3 Calibration manager ‹page 63›* for more information.
- **Define new ink:** creates a new ink by showing the *Define ink* window. See section *6.6.2 Ink properties window ‹page 67›* section for details.
- **Ink manager:** shows the *Ink manager* (docker) window. This window manages the available inks in the Cascade system. If this window is docked to a holder, it will be brought to the foreground. See section *6.6.1 Ink manager window ‹page 67›* for more information.
- **Add color profile:** adds a new ICC/ICM color profile to the Cascade system. See section *6.3 Color profiles ‹page 63›* for details.
- **Color profiles:** shows the *Color profiles* (docker) window. This window manages the available ICC/ICM color profiles available in the Cascade system. If this window is docked to a holder, it will be brought to the foreground. See section *6.3 Color profiles ‹page 63›* for more information.

4.2.3 Job menu

- **Check selected jobs:** sends the job(s) selected in the *Job browser* window to the *Print manager* or to the third party TIFF catcher software for printing.
- **Uncheck selected jobs:** un-checks the selected job(s), holding them in the *Job browser* list until they are checked.
- **Stop job:** stops processing the selected job, but the previously processed pages will remain available.
- **Delete job(s):** deletes the selected jobs in the *Job browser* window.
- **Combine jobs:** transforms the selected jobs into one job, containing all the pages of the original jobs.
- **Split job:** creates a new job, extracting the selected pages from the original job.
- **Merge plates:** merges the selected plates of a job, resulting in one plate. The source plates will be deleted, except the last one selected (the plate which is visible in the preview window), which will contain the result of the merge.
- **Export image:** exports one or more pages from the job to JPEG files. See section *5.4.1 Exporting to PDF or JPEG ‹page 38›*.
- **Ink zone calculation:** calculates the ink coverage for each ink zone in order to adjust the ink ducts of an offset press. See section *5.4.2 Ink duct control ‹page 39›*.
- **Job information:** displays the *Job information* window, containing information about the job, as well as the pre-flight warnings (if any).

4.2.4 Imposition menu

- **Imposition:** opens the *Imposition* window, used for making new impositions, usually without saving the imposition style. See section *8.3 Imposition properties ‹page 84›* for more details.
- **Clear imposition:** removes the imposition, and initializes the job to its initial state (before any imposition).
- **Imposition styles:** shows the *Imposition styles* (docker) window. This

window manages the available imposition styles in the Cascade system. If this window is docked to a holder, it will be brought to the foreground. See section *8.2 Imposition styles ‹page 84›* for more information.

- **Select pages on sheet:** selects all the objects (pages and pre-press marks) on an imposition sheet.
- **Select signature 1:** selects the imposition sheets belonging to the first signature. In cases involving double sided jobs, it will select the odd sheets.
- **Select signature 2:** selects the imposition sheets belonging to the second signature. In cases involving double sided jobs, it will select the even sheets.
- **Add page to sheet:** adds a new page to an imposition sheet. See *8.4 Manual imposition ‹page 88›*.
- **Delete selected pages on sheet:** deletes the selected pages on an imposition sheet. See *8.4 Manual imposition ‹page 88›*.
- **Add prepress mark:** opens the *Add prepress mark* window, used for adding new, user-defined prepress marks. See section *8.5.2 Pre-press mark properties ‹page 89›* for more information.
- **Prepress marks:** shows the *Prepress marks* (docker) window. This window manages the available prepress marks in the Cascade system. If this window is docked to a holder, it will be brought to the foreground. See section *8.5.1 Pre-press marks manager ‹page 89›* for more information.
- **Crop with bleed:** shows the *Crop with bleed* window, used for cropping pages. The cropped parts will remain available as bleed. See section *8.6.3 Using the Crop with bleed command ‹page 92›* for more information.

4.2.5 Proof menu

- **Proof:** prints a raster proof of one or more pages of a job on a proofing device. You need to have a raster proof profile created first. See sections *5.4.3 Proofing ‹page 40›* and *10.3 Printing proofs ‹page 122›* for details.
- **Spectrophotometer setup:** connects a spectrophotometer to Cascade. Spectrophotometers will be needed for setting up the proofer. See *10.2.1 Spectrophotometer setup ‹page 114›* for details.
- **Proofer linearization wizard:** calibrates the proofer to give a linear output. See *10.2.2 Proofer linearization wizard ‹page 114›* for details.
- **Contone proof wizard:** profiles a color printer in contone printing mode, creates the ICC profile of the printer, and creates a contone proof profile. See *10.2.3 Contone proof wizard ‹page 115›* for details.
- **Halftone proof wizard:** profiles a color printer in halftone printing mode for the specified target job style, creates the ICC profile, and creates a halftone proof profile. See *10.2.4 Halftone proof wizard ‹page 117›* for details.
- **Raster proof wizard:** creates a raster proof profile, profiling the printer in raster proofing mode. *10.2.5 Raster proof wizard ‹page 118›* for details.
- **Test proof wizard:** tests the color accuracy of an ICC based proof profile. See *10.2.6 Test proof wizard ‹page 121›* for details.
- **Color checker:** compares a reference color (CMYK or Lab values) to a measured color, displaying the ΔE result.

4.2.6 Tools menu

- **Connection settings:** shows the *Connection settings* window, managing the settings of the Client–Server connection (such as IP address, JPEG compression etc.). The language of the Client can also be changed here (i.e. effective only locally). See section *6.9.2 Connection settings ‹page 70›* for further details.
- **Client options:** shows the *Client options* window, managing the settings of the Client application (i.e. effective only locally). See section *6.8 Client options ‹page 68›* for further details.
- **Server options:** shows the *Server options* window, managing the settings of the Server application (i.e. effective globally). See section *6.9.1 Server options ‹page 70›* for further details.
- **GhostScript console:** shows the *GhostScript console* (docker) window. This window shows the text output of the PostScript interpreter. Details about PostScript errors, as well as processing times and other information are available here. If this window is docked to a holder, it will be brought to the foreground.
- **Users:** shows the *Users* (docker) window. This window manages the users of the Cascade system. See section *6.7.1 Users window ‹page 68›*.
- **Update Cascade:** checks the Cascade web site for the presence of a newly released version of Cascade, and launches the updater application if needed.

4.2.7 Dockers menu

- **Hide/show dockers:** hides or shows the entire panel on the right side of the Client window, making the Preview window full width.
- **Auto-hide dockers:** hides the entire panel on the right side of the Client window automatically, making the Preview window full width, but automatically shows it if the mouse is moved to the right side of the Client window (similarly to the auto-hide taskbar feature of Windows).

- **Dockers:** show or hide the docker selected in the menu. If this window is floating or docked to a holder (even if hidden by another docker), it will be closed. If it is invisible, it will be shown (either as a floating window or as a docker, depending on the default state of the window).

For the description of the dockers, see *4.5 Dockers ‹page 31›*.

4.2.8 Help menu

- **User manual:** downloads and opens the Cascade user manual in the embedded PDF viewer of the default web browser.
- **Cascade on the web:** opens the Cascade home page.
- **About:** shows the version and copyright information of Cascade.

4.3 STANDARD TOOLBAR

Placing the mouse cursor over a button will trigger the display of the tool tip (a short explanation in yellow background) for the button.

The standard toolbar contains mostly icons which are doubling menu items (such as *Open, Connect* etc.), explained in the previous chapter. However, there are a few icons and tools that were not described previously:

- **Zoom drop-down box:** sets and displays the zoom of the current preview. Values can be chosen from the list or entered from the keyboard, with or without the '%' sign. *Fit page, Fit width* and *Fit height* values are also available.
- **Zoom to fit:** sets the zoom to fit in the entire page.
- **Zoom to width:** sets the zoom to fit the width of the page.
- **Zoom to height:** sets the zoom to fit the height of the page.

4.4 PREVIEW WINDOWS

The preview windows allow jobs to be viewed before they are sent to the print engine. There are four preview windows: *Separations, Composite, Imposition* and *Media*. The first three are previewing the job that is selected or the job with a child node selected. The preview is empty if no job is selected.

The media view is previewing the printer profile that is selected or the printer profile with a child node selected. The preview is empty if no printer profile is selected.

This inconsistency is caused by the fact that the media saving can put pages from two jobs on the same piece of media, so the media has to be previewed at printer profile level.

See the description of the preview tools and preview settings bar in section *5.3.1 The viewer window and its controls ‹page 36›*. See the descriptions of the four views in sections *5.3.2 ‹page 36›*, *5.3.3 ‹page 37›*, *5.3.4 ‹page 37›* and *5.3.5 ‹page 38›*.

4.5 DOCKERS

Cascade uses several windows for managing styles, profiles, inks etc. These windows can be used as floating child windows or can be docked into one of the three holders, located at the right side of the Client window.
The following operations are possible with these windows:

- **dock a floating window:** drag the window over one of the three holders (by clicking and holding on its title bar with the left mouse button and dragging it);
- **undock a docked window:** drag the window out from the holder (by clicking and holding on its tab with the left mouse button and dragging it);
- **close a docked window:** uncheck the appropriate item in the *Dockers* menu, or undock the window and then close it;
- **show an invisible window:** check the appropriate item in the *Dockers* menu, or use the appropriate menu items or buttons if available (e.g. the *Job styles* window can be shown by its menu item in the *File* menu).

4.5.1 Job browser

This docker manages the jobs in the Cascade system. It allows you to:

- **select a job** by clicking on it. After a job has been selected, it can be previewed or other operations can be performed on it;
- **select pages of a job** by expanding the node of the job, and selecting a child node. This operation will also modify the foreground/background status of the preview windows such that the preview window matching the parent node will come to the foreground (e.g. will show the Composite preview if a composite page has been selected);
- **check a job** by clicking on its checkbox or by clicking on the *Check selected jobs* button in the toolbar of the *Job browser* docker; this will send

the job to the *Print manager* or to the third party TIFF catcher software for printing;

- **stop a job** by selecting it and then clicking on the *Stop* button; this will stop processing the job, but the already processed pages will remain available;
- **delete a job** by selecting it and then clicking on the *Delete* button;
- **combine jobs** by selecting them and then clicking on the *Combine jobs* button; this will transform the selected jobs into one job, containing all the pages of the original jobs;
- **split jobs** by selecting separations or composite pages of a job, and then clicking on the *Split job* button; this will create a new job, extracting the selected pages from the original job;
- **merge plates** by selecting separations pages of a job, and then clicking on the *Merge plates* button; the selected plates will be merged into one plate. The source plates will be deleted, except the last one selected (the plate which is visible in the preview window), which will contain the result of the merge.
- **drag pages** within one job or from one job to another (allowed for separations and composite pages); this will move the dragged pages, changing their order or moving them from one job to another;
- **export JPEG images** of one or more pages of a job;
- **proof** of one or more pages of a job by printing it on a proofer;
- **manage the queue** under the *Job queue* node, allowing deletion of queued jobs or to change their order by drag & drop.

For more information, see sections *5.1 Opening a job ‹page 33›*, *5.2 Processing a job ‹page 35›*, *5.3 Previewing and changing job ‹page 36›* and *5.5 Sending a job to the Print manager ‹page 41›*.

4.5.2 Calibration manager

The calibration curves can be added, removed or edited in the *Calibration manager*. See section *6.4.3 Calibration manager ‹page 63›*.

4.5.3 Color profiles

The *Color profiles* window manages the ICC/ICM files present in the system. See section *6.3 Color profiles ‹page 63›*.

4.5.4 Ink manager

The inks known by the system are managed in the *Ink manager* window. See section *6.6.1 Ink manager window ‹page 67›*.

4.5.5 Imposition styles

The imposition window manages the imposition styles. Using this window, impositions can be added, removed or edited. See section *8.2 Imposition styles ‹page 84›*.

4.5.6 Job styles

The job styles specify how a job will be processed (printer profile, screen frequency, dot size, geometry, in-rip separations etc.). These styles are managed in the *Job styles* window. See section *6.2.1 Job styles manager ‹page 51›*.

4.5.7 Ghostscript console

This window is the text output of the PostScript interpreter. Details about PostScript errors, as well as processing times and other information related to processing are available here.

4.5.8 Pre-press marks

Pre-press marks can be added, removed or edited in the *Pre-press marks* window, allowing the user to use custom pre-press marks. See section *8.5.1 Pre-press marks manager ‹page 89›*.

4.5.9 Print manager

This window is the user interface of the Print manager application(s) in the Cascade system. If more than one Print manager is used in the system, each of them will be represented by a node in the tree. See section *5.6.1 The Print manager docker ‹page 42›*.

4.5.10 Printer profiles

Printer profiles can be added, removed or edited in the *Printer profiles* window. Normally the profiles are generated by the *Add print engine wizard*, but they can later be modified, deleted or added if necessary. See section *6.1 Printer profiles ‹page 45›*.

4.5.11 Users

The user accounts are managed in the *Users* window. See section *6.7.1 Users window ‹page 68›*.

5 Printing a job

A job's route through the Cascade is as follows:

- A job can arrive to the Cascade Server in one of five ways: through the Cascade printers, through the hot folder system, by starting a new Cascade Server instance with the job name on command line, by double clicking the job's icon from Windows Explorer or by opening it with the Client;
- The job is queued in the *Job queue*, then processed;
- If the *Do not print until checked* option is turned off in the job style, the pages will go to the Print manager immediately, in this case it is assumed that they are ready to print. If this option is turned on, the job will stay in the job browser list to allow the operator the chance to do tasks like preview, modify, impose, proof, export JPEG, calculate ink duct information, etc. It will be sent to the Print manager (or 3rd party TIFF catcher) only after it is marked as *checked* (by ticking the check box to the left of the job in the *Job browser*);
- Once it arrives at the Print manager, the processed job will be queued and printed (unless the print engine is not ready for printing, or the Print manager is paused);
- Finally, assuming the job goes via the Print manager, the job will be archived in the History, from where it can be retrieved for reprinting if necessary.

The following chapters will describe in detail the steps above.

5.1 OPENING A JOB

Cascade accepts PostScript of PDF jobs, either as PS/PDF files or as PostScript data coming through the Cascade printers.
The typical ways of opening jobs in Cascade are:

- Printing to a Cascade printer from an application;
- Exporting a job to a PDF file, and then opening the created PDF file with the Open command, as a RipServer.exe command-line parameter, by selecting Open with Ripserver.exe from the Explorer's File menu, or through the hot folder system;
- Generating a PostScript file (either by a special command of the DTP application, or selecting the *Print to file* option and printing to a Cascade or another PostScript printer), then opening the created PostScript file with the Open command, as a RipServer.exe command-line parame-

ter, by selecting Open with Ripserver.exe from the Explorer's File menu, or through the hot folder system.

Cascade accepts either composite or separations jobs, but in most cases we recommend using composite: trapping is only possible on composite jobs, there is more control over the separation process (overprints, for example), the processing speed is higher, and there are no problems with grouping separation plates into composite pages.
Technically, a job can be passed to the Cascade in five ways:

- Using the Cascade printers,
- Using the hot folder system,
- Opening the job by the *Open* command of the Client (or drag & drop over Client program's window),
- Using the Open with Ripserver.exe command from Windows Explorer,
- As a RipServer.exe command-line parameter.

5.1.1 Using the Cascade printers

Unless having the *Create printer only for the default job style* option checked or the *Share the created printers* option unchecked, Cascade will create and share a printer for each job style as they are added. For example, if a job style called *New job style* is created in the Cascade system, a printer called *Cascade – New job style* will be automatically added to the operating system, and becomes visible over the network as the *New job style* network printer. Cascade Server captures all the print jobs printed on this printer, and will open them using the job style called *New job style*. In effect Cascade will act as a PostScript printer, any Windows program will be able to print directly to it, without making PostScript files or performing any other operations.

Having the shared network printer created automatically, and unless there is a firewall or an operating system setting blocking the visibility of the printer, it is possible to print to this network printer from anywhere in the network. Windows XP automatically connects to shared network printers; with Macs and other, older systems, manual installation may be necessary.

To summarize, when printing to these printers from any application in the network, the print job will automatically be processed by Cascade. With the proper setup, it can be automatically printed too, without any user intervention.

5.1.2 Using the hot folder system

Using the Hot Folder system is the recommended way to process PostScript or PDF files, especially for pre-press studios that deal with files from different customers, all needing different job styles. Shortcuts to the corresponding hot folders of the job styles can be easily created in the *Job styles* docker, using the *Create shortcut* button. See chapter *3.3 Setting up the hot folders ‹page 25›* for more information.

Dropping a PDF, PS or EPS file into these hot folders (or dragging them to their shortcuts) will automatically pass the files to the Cascade. The files will be opened using the job styles with the same name as the name of the subfolder, or using the default job style if there is no matching job style name.

5.1.3 Using the Open command of the Client

The *Open* command of the Client program is the best way to open a job and manually specify the job style. The job is loaded by the client (which sees the file system of the PC running it as local) and then it is transmitted to the server through the TCP connection between the Client and Server. This command may be slower than the hot folder system if the Client and the Server are on the same computer, because moving the file into a folder is much faster than copying it through a TCP channel.

On Mac workstations, the Open command will see the file system of the Server PC, and the shared network resources available to the Server PC.

However, it is possible to open a job with the Open command from a Mac, if the file to be opened is in a location that is available to the Server PC. Therefore, if the file is on the local Mac workstation, this workstation must be shared on the network, it can then be browsed from the *Open* window of the Client.

Note that dragging & dropping the job icon over the Client program's window has the same effect as the job would open using the *Open* command.

5.1.4 Using the Open with… command from Explorer

Opening file using the *Open with…* command (or double clicking on its icon in an Explorer window) essentially starts a new Ripserver.exe instance passing the job's file name as command-line parameter, see *5.1.5 Using command-line parameters ‹page 35›*. Since only one Cascade Server is al-

lowed to run at the same time, if another instance is already running, the new instance will pass it the filename for processing, then will quit.
The file always will be opened using the default job style.

5.1.5 Using command-line parameters

Ripserver.exe opens the job(s) whose filename(s) were passed as command line parameters, separated by spaces. Enclose the path in quote marks if the name contains space character. Ripserver.exe also recognises the following command-line switches for processing a job:

- **-p*PrinterName*** the printer the job cames from;
- **-n*FriendlyName*** name to be displayed in the Client program's Job browser. Default value: the file name;
- **-s*JobStyle*** used job style. Default value: the default job style;
- **-rlow|normal|high** job priority. Default value: normal priority;
- **-t** used internally for transparency flattening.

The order the command-line switches are specified is not significant and they may precede or follow the file name(s). If more than one file name is present, they will share all command line settings, including the **-n** switch. The following command line will open 2 jobs as they would come from *AccuSet1500* printer, processing on high priority using '*AccuSet 1500 @ 2400 dpi*' job style and displaying the name '*Summer Collection*' for both items:

Ripserver.exe "c:\users\dtp\summer collection2.PDF" e:\calibration.PDF -rhigh "-sAccuSet 1500 @ 2400 dpi" "-nSummer Collection" -pAccuSet1500

5.2 PROCESSING A JOB

5.2.1 The Job queue

The opened jobs are queued to the printer profile specified by the job style. If the PostScript engine is idle, the job will start to be processed immediately; otherwise it will wait in the queue. The queue can be observed and monitored in the job browser window. Jobs can be deleted or moved (using drag & drop) in the queue to change their processing order.

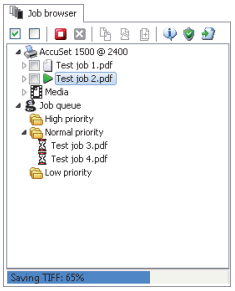
5.2.2 Processing phase

A blinking green arrow indicates that a job is being processed. To follow the processing progress, select the job in the *Job browser* list by clicking on its name. A progress bar and other information will be then available in the status bar of the *Job browser* window.

Jobs can be stopped using the *Stop* button on the toolbar. Stopping the job may take a few seconds.

As the pages of the job are processed, they appear in the job browser tree and can be previewed, even if there are other pages to process. They can also be deleted, changed, moved etc.

The job can also be sent for printing whilst it is still being processed, though this does not allow the possibility of verifying it on the screen or modify it.

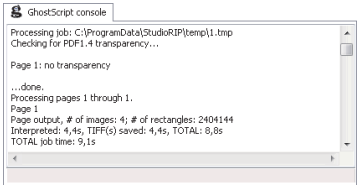


5.2.3 Preflight warnings

Cascade will warn the user if potential errors are detected regarding a job, such as using the same screen angle on plates belonging to the same page, job sizes which exceed the media size, etc.

The preflight warning will appear as an exclamation mark in the job icon, with yellow or red background (depending on the severity of the detected problem). The preflight warning reporting is fully customizable (typically a warning can be ignored, but remember that the severity cutoff level may have been changed), see section *6.8.2 Preflight tab ‹page 69›*.

The warning can be viewed by selecting the job with the warning, then clicking on the 'Click here to see the preflight warning' text at the status bar of the *Job browser* window, or clicking on the *Job information* button above the window.


GhostScript console
Processing job: C:\ProgramData\StudioRIP\temp\1.tmp
Checking for PDF1.4 transparency...
Page 1: no transparency
...done.
Processing pages 1 through 1.
Page 1
Page output, # of images: 4; # of rectangles: 2404144
Interpreted: 4,4s, TIFF(s) saved: 4,4s, TOTAL: 8,8s
TOTAL job time: 9,1s

5.2.4 The Ghostscript console

It is possible to follow the messages of the PostScript/PDF engine in the Ghostscript console docker. Both *%stdout* and *%stderr* outputs are redirected to this window (including PostScript errors or warnings). In addition, details of processing – e.g. rendering times – will appear here.

5.3 PREVIEWING AND CHANGING JOB

A job can be previewed by clicking on its listing in the *Job browser* tree view. The preview will appear in the viewer window on the left.

5.3.1 The viewer window and its controls

On the left of the windows, there are 6 tools:

- **Arrow tool**: this is used exclusively in the imposition view for selecting and moving pages on the sheet.
- **Zoom:** the default tool. Use the left mouse button to zoom in. Combining it with the CTRL key or using the right mouse button will zoom out of the image. Selecting a rectangular area on the image zooms to that area. Using the mouse wheel combined with the CTRL button will zoom in and out.
- **Hand tool**: moves the image within the viewing area without using the scroll bars; pressing and holding the space key will temporarily switch to the hand tool. Scrolling the image is also possible by using the mouse wheel with (horizontal) or without (vertical) the SHIFT key held down.
- **Measuring tool:** is used to measure the size of a given area of the job; select the area to be measured with this tool (without releasing the mouse button). The width and height of the area selected is shown at the bottom of the window.
- **Paint white tool:** erases (by painting white) areas on separations or composite pages. Useful for retouching pages (deleting unneeded texts or objects, for example).
- **Paint black tool:** fills (by painting black) areas on separations or composite pages. Useful for retouching pages (deleting unneeded texts or objects on black background, for example).

Each of the four views has the following controls (located around the view windows):

- **Horizontal and vertical measures:** change the measuring units by clicking the button in the upper-left corner;
- **Four view orientation buttons:** change the viewing orientation, without changing the job itself (very useful for checking vertical or upside-down texts);
- **Navigation buttons:** change which page to view with these buttons;
- **Color/monochrome button:** only available for the separated views (separations and media); specifies whether a separation page will be shown as black & white or in its original color;
- **Continuous film view button:** (only available in the media view) specifies whether the media is shown as one continuous piece of media, or as separate pages;
- **Labels:** show the numerical sizes of the pages.

Changing the color view mode or preview orientation does not change the output, these are just preview options!

5.3.2 Separations view

The separation view shows the pages of the job as separations, in black & white or in their original color. Separated pages can be viewed even if the input job was composite.

Switch to separations view either by clicking the *Separations* tab above the view window, or by expanding the *Separations* node under the node of the job in the *Job browser,* then clicking on any separation of the page.

Separation pages can be deleted or moved within the job or to another job.

If there are unwanted separation pages in the job, remove them by selecting them in the *Job browser* and then clicking the *Delete* button on the toolbar or pressing it on the keyboard.
In the separations view, the toolbar contains some general information about the job:

- Job style being used for processing the job,
- Printer profile that the job belongs to,
- Resolution (in dpi) of the job,
- Dot type and screen frequency of the screen used.

Job style: AccuSet
Printer profile: AccuSet 1500 @ 2400
Resolution (dpi): 2400
Dot type: Euclidean
Screen frequency (lpi): 170 lpi

The separations can be viewed as black and white or in their true colors by the *Show in color* button, located at the bottom of the view window.

5.3.3 Composite view

The composite view shows the pages of the job as composite color pages, even if the input job was pre-separated. Apart from the standard CMYK, custom colors can also be seen in their true colors. Switch to composite view either by clicking the *Composite* tab above the view window, or by expanding the *Composite* node under the node of the job in the *Job browser,* then clicking on a separation page.

Composite pages can be deleted, moved within the job or to another job. If there are unwanted composite pages in the job, remove them by selecting them in the *Job browser* and then clicking the *Delete* button on the toolbar or pressing it on the keyboard.

Within the composite view, it is possible to change the colors of the pages. Usually it will be unnecessary to use this feature, because Cascade is able to intelligently guess how the separations should be grouped into the correct color pages, even for pre-separated pages with poor color information. However, there may be cases when it is desirable to modify the colors and the grouping of the pages, especially if imposition will be applied later (which is based on composite pages).

Each composite page retains the number of separation pages associated with it, including the respective names of the colors. It is possible to modify the names of these colors, the number of separations associated with the page, and even define new colors.

The control bar indicates the settings of the selected composite pages. If the selected pages differ, the settings cannot be displayed, in which case a message will appear, offering the chance to select one page only.

Color group style:
Number of colors:
The color group styles of the selected pages are different. Click here to select the currently viewed page.

When no pages are explicitly selected, the program will treat all the pages in the job as being selected; so if the pages of the job use different (or extra) colors, the message above will be displayed.
Here are a few simple examples of how to change the job with this control:

- Cascade recognized the pre-separated pages of a CMYK job as different monochrome pages: simply choose the *CMYK* color group style from the list, which will set the number of colors per page to 4 and the colors of each page to Cyan, Magenta, Yellow and Black;
- Spot colors were sent as process colors (e.g. *Pantone 300 C* as cyan), and the process colors now need to be replaced by the intended spot colors. Choose a previously defined color from the drop-down list by clicking the arrow near the corresponding button, or, by clicking on the button, define a new color.

New *color group styles* can be created and saved if the same color combinations are being used regularly. For example, if two colors (e.g. blue and orange) are often printed but are printed as cyan and magenta. Define the two colors used, making a *color group* of these two colors, and then save it as *Blue and orange* color group style. It is then possible to change any subsequent jobs by one click into *Blue and orange*.

A color named *Transparent* is defined to allow previewing the job with certain colors hidden (typically for checking the overprint by temporarily hiding the black ink, changing it into *transparent*).

Do not use the *Number of colors* setting for temporarily hiding colors. Use the *Transparent* ink instead.

5.3.4 Imposition view

The imposition view is intended to show exactly what will come out on the press; in this view it is possible to add pre-press marks, create complex impositions, etc.

Note that jobs with bleed may use the trimmed size by default, rather than

the full processed size (depending on the job style settings – checking the *Imposition* option will do this by default), in which case neither of the preview windows will show the full processed size (in other words, the bleed will remain hidden). Only the parts of the bleed that fit on the sheet are visible; impositions will generally create space for the bleed to show (by increasing the sheet and leaving gutters). See *8.6 Bleed ‹page 91›* for further information.

Switch to imposition view either by clicking the *Imposition* tab above the view window, or by expanding the *Imposition* node under the node of the job in the *Job browser,* then clicking on a single page.

Imposition sheets cannot be deleted or moved, the very nature of imposition does not make it possible. Therefore, to delete an imposition sheet, delete the composite pages of the job belonging to an imposition sheet.

For a deeper understanding of how the imposition works, we recommend reading chapter *8 ‹page 83›*.

5.3.5 Media view

The media view allows previewing of the jobs, as they will be arranged on the media. Switch to media view either by clicking the *Media* tab above the view window, or by expanding the *Media* node under the node of the job in the *Job browser,* then clicking on a single page.

This is the only preview where the effects of the mirror and negative settings are visible, in order to keep the readability and accurate colors of the other three previews.

The media settings (size, media saving etc.) which influence the placement of jobs on the media are stored in the printer profiles, see section *6.1 Printer profiles ‹page 45›*. However, there are shortcuts to the two most important settings of the printer profile that affect the way the jobs are arranged on the media: the Page placement and Try to use maximum media length options can be changed via the controls on the toolbar.

Similarly, the mirror, negative and orientation controls can change the way the job appears on the media. The state of these controls is inherited from the settings of the *Imaging* task in the job style, but they can be changed on a per job basis.

There are viewing options for the media view: by toggling the button *Continuous view*, the media can be viewed as one continuous roll or individual pieces of media. The *Show in color* button will help visualize how the different colors are placed on the media (even if on the film they are really coming out as black).

Changing the negative state of the job at this level is not recommended if there are calibration curves involved. Calibration curves must be applied in a different way for negative jobs during the halftoning process, therefore the negative option needs to be specified in the job style.

5.4 PERFORMING OTHER TASKS ON THE JOB

5.4.1 Exporting to PDF or JPEG

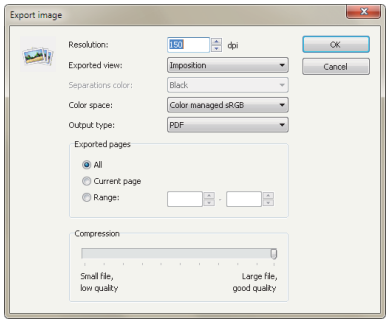
Cascade is able to export pages of the jobs as PDF files or JPEG pictures. These files are intended as soft proofs, and aren't recommended for further processing (the PDF files will also contain embedded JPEGs – or other bitmap data – rather than vector graphics). The (embedded) images are the same quality as the onscreen previewing system of Cascade:

- In case of halftone jobs, they are resampled from the original 1-bit TIFFs, therefore false moiré can occur.
- If *Color managed sRGB* output is chosen, the colors come through the ICC-based color management system, so the image has the color accuracy of a soft proof. However, color accuracy is achieved only on low zoom levels where the halftone is invisible, and the calibration curves are correctly neutralized.

Therefore these pictures can be extremely useful not just for checking the integrity of the page (texts, images), but also for checking the colors of the job. The *Export image* command is in the *Job* menu, and is enabled if a job is selected. The following settings are available:

- **Resolution:** the resolution of the generated picture, defaulted to 150 dpi. Higher resolutions are possible, but are not recommended for several reasons (long processing time, large JPEG file, possible moiré problems).
- **Exported view:** specifies whether the composite, separations or imposition view of the job will be exported.

- **Separations color:** available only when separations view is chosen. Controls whether separations will be exported as black or in their original color.
- **Color space:**
  - *Color managed sRGB:* recommended for color or content proofing. The job will be converted into the standardized sRGB color space, which will be dis-played in the same way on calibrated monitors. In this mode the files will be well compressed and suitable for sending over the Internet.
  - *CMYK or N-color (PDF only):* recommended only if the separations need to be accessed separately. The separations of the job will be stored un-changed, so the displayed colors will depend on the CMYK working space setting of the PDF viewer application. As embedded images are compressed in a lossless manner in this mode the file size will be significantly bigger.
- **Output type:** specifies whether a PDF or JPEG (*Color managed sRGB* only) file will be exported.
- **Exported pages:** the pages of the job to export (with all pages, current page or page range options).
- **Compression:** the quality of the JPEG compression, as a compromise between quality and file size.

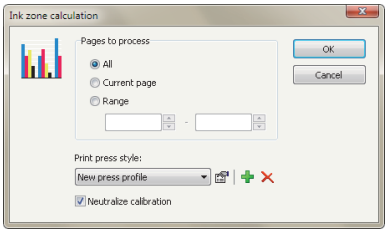


After clicking the OK button, the save dialog box will appear.

5.4.2 Ink duct control

The ink duct control feature can make the life of the offset printer much easier, and at the same time can offer more constant quality. Cascade is able to calculate the ink coverage for each ink zone of the page, belonging to each ink duct, and to print a diagram or to export a PPF or JDF file (that will control the offset press directly).

The ink duct control feature can be used either through the ink duct task of the job style, or by the *Ink zone calculation* command.

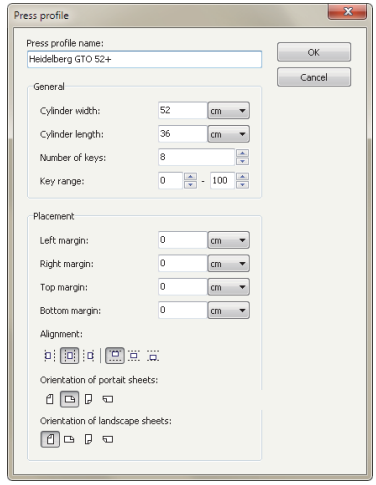


The *Ink zone calculation* command is in the *Job* menu, and is enabled if a job is selected. The following settings are available:

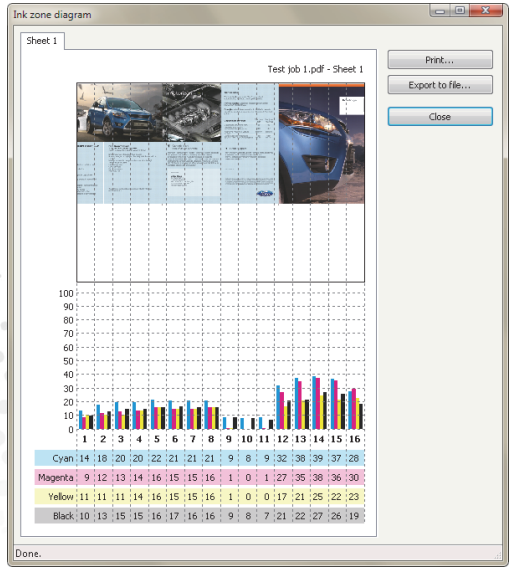
- **Pages to process:** which pages of the job to calculate the ink zone information for (with all pages, current page or page range options).
- **Print press style:** offers the chance to save the properties of several printing presses as styles, so then the cylinder size and number of keys parameters will not have to be entered manually each time.
- **Neutralize calibration:** recommended setting is on, to work with the intended shades (as in the DTP application) rather than the actual shades in the 1-bit TIFF file. Calibration curves might produce significant differences.

Print press styles can be added using the *Add* button in the right of the print press style drop-down box, or edited with the *Properties* button. The *Press profile* dialog has the following settings:

- **Cylinder width:** the width on which the ink keys are placed (the width of an ink zone will be equal to the cylinder width divided by the number of keys).
- **Cylinder length:** the length is measured on the cylinder circumference.
- **Number of keys:** the number of ink ducts on the offset press. In case of flexography, it is equal to 1.
- **Key range:** the minimum and maximum levels of ink duct keys. The default values are in percentages, but older printing presses may use different ranges (e.g. the minimum value is 2, the maximum value is 20). If such values are specified, Cascade will perform linear interpolation on the ink duct data to match the specified range.



- **Left, right, top and bottom margins:** define the area on the plate where the job will be placed.
- **Alignment:** defines the horizontal and vertical placement of the job on the plate, relative to the margins defined above.
- **Orientation of portrait sheets:** if the orientation of the sheet in Cascade is portrait (that is, its width is less than its height), then the orientation setting chosen here will be used for the placement of the given job on the plate.
- **Orientation of landscape sheets:** if the orientation of the sheet in Cascade is landscape (that is, its width is longer than its height), then the orientation setting chosen here will be used for the placement of the given job on the plate.



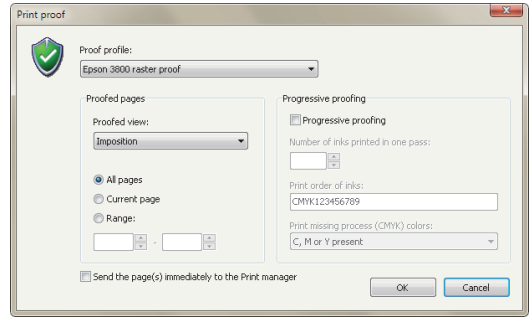
Clicking the *OK* button of the *Ink zone calculation* dialog, the *Ink zone diagram* window will appear, and in a few seconds the diagram(s) will start to arrive from the Server.
The following choices are available:

- **Print:** prints the diagram on to a locally installed Windows printer (i.e. on the PC running the Client).
- **Export to file:** generates a PPF (CIP3) or JDF (CIP4) file that can be used by newer models of offset presses.

5.4.3 Proofing

If the Cascade proofing system is properly set up, raster proofs of the jobs can be printed with the *Print proof* command in the *Proof* menu. The command is enabled only if a job is selected. Raster, halftone or contone proofs can be also printed through the *Proofing* task of the job styles.
The following options are available:

- **Proof profile:** a special printer profile created by the *Raster proof wizard*. See *10.2 Setting up the proofing system ‹page 114›* for further information.
- **Proofed pages:** the pages of the job to proof (with all pages, current page or page range options).



- **Send the page(s) immediately to the Print manager:** if checked, the pages will start to be printed immediately. Otherwise the user has the choice to verify how the job is placed on the media of the proofer.
- **Progressive proofing:** enables Cascade to simulate not just the final result of the printing process, but also the intermediate steps. For example, a printing press can print one ink at a time (in which case the progressive proofing of a CMYK job will show the four steps of the printing process: *C, CM, CMY* and *CMYK*), two inks at a time (in which case the progressive proofing will show the *CM* and *CMYK* steps), etc. The following settings will control the progressive proofing:

  - *Progressive proofing:* will control whether progressive proofing is enabled;
  - *Number of inks printed in one pass:* specifies the number of inks that the printing process can print in one pass;
  - *Print order of inks:* specifies the order the CMYK and spot colors are printed. The digits specify the order of the spot colors. For example, the *CYMK21345678*9 string will instruct Cascade that the CMYK colors are printed in a different order (the magenta and yellow swapped), as well as the order of the first two spot colors are swapped relative to their order in Cascade.
  - *Print missing process (CMYK) colors:* specifies what to do in a case where one or more of the 4 process colors are missing in the proofed job. The *Never* setting will not print missing process colors; the *C, M or Y present* option will print the missing process colors only if at least one non-black color is present (but will only print *K* if black is the only process color); the *C, M, Y or K* option will print the missing process colors if any process color is present; the *Always* option will always print all four CMYK colors, regardless of whether they are present or not.

The effect of the *Print proof* command is that the selected page(s) are copied into the selected proof profile. When sending jobs from proof profiles, Cascade will embed all the necessary information for proofing into the outgoing TIFF file, so that the Print manager will be able to apply the right color management when printing the job. See chapter *10 ‹page 111›* for a deeper understanding of how the Cascade proofing system works.

5.4.4 Imposition

Cascade has a post-RIP imposition system. This means that the imposition is done *after* the jobs have been processed, i.e. when they are in the job browser. See chapter *8 ‹page 83›* for a deeper understanding of how the Cascade imposition system works.

5.4.5 Retouching

Minor retouching tasks (such as erasing unnecessary objects on white or black background) can be easily done with Cascade even after processing.

Note that at this phase the job doesn't contain vector objects anymore, it is now one high resolution bitmap. Therefore retouching isn't object based (e.g. a text object on a bitmap cannot be removed); it is only able to paint white or black rectangles over the image.

Retouching works for separations or composite pages. Using it on separations is useful when only certain plates need to be modified (for example, deleting the CMY components of a text, keeping just the black one).
There are two tools available for retouching at the left of the preview window:

- **Paint white tool:** erases (by painting white) areas on separations or composite pages. Useful for retouching pages (deleting unneeded texts or objects, for example).
- **Paint black tool:** fills (by painting black) areas on separations or composite pages. Useful for retouching pages (deleting unneeded texts or objects on black background, for example).

5.5 SENDING A JOB TO THE PRINT MANAGER

After the job has been modified and/or verified, it can be marked as checked. However, if the *Do not print until checked* option is off in the job style being used, the job (or page of the job) will be printed immediately there are enough pages processed to start printing.

An understanding of what happens to a job when it leaves the job browser is important. This is the phase when all the manual or automatic modifications applied to the job are rendered (such as pre-press marks, imposition, film saving or automatic rotation). This is also the phase when the job data finally leaves the Server and is passed to the Print manager or to the third party TIFF catcher software (which may be installed on another computer).

If the *Allow fast copy* option is checked in the *Server options* dialog, and if there are absolutely no changes to the job (not even automatic rotation), this process consists of a simple file move operation (which takes milliseconds if the Print manager is on the same computer and disc partition as the Server), otherwise the source TIFF files have to be read, combined and written to a

single destination TIFF file. This may take a few seconds for each page (possibly even longer; the transfer time is a function of the connection speed between the Server and the Print manager, the computer's speed, the file sizes, and the complexity of the rendering operations to perform, such as rotating a page).

When media saving is turned on, a job will only be sent to the Print manager when there is absolute certainty that a following page cannot fit on the same piece of media. To achieve this, the first page will be held until the subsequent page is processed and has been assessed to see whether it will fit onto the media with the current page.

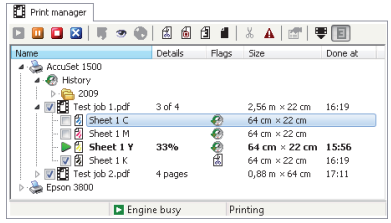
To allow media saving to put two pages, from different jobs, on the same piece of media, it will be necessary for both jobs to be marked as *checked* (and thereby released to the Print Manager) at the same time. This will ensure that the media saving can perform in the way that is shown in the media view. The simplest way to do this is to select the jobs to be sent, and then check them all together by the *Check selected jobs* button in the toolbar.

5.6 IMAGING A JOB WITH THE PRINT MANAGER

5.6.1 The Print manager docker

The recommended way of using Cascade is with the Print manager as the interface between the RIP and the print engine wherever possible. The alternative is to use third party software that will accept 1-bit TIFF files into a hot folder (a TIFF catcher), in which case the Print manager will not be used.

If Print manager is being used, it can be controlled directly from the Client, making many useful features available. The Client can control several Print managers in one window, each Print manager having its own icon in the Client's Print manager docker. The Client connects to the Print manager(s) through the Cascade Server application, so no additional data channels are needed even if some of the Print managers are on different computers.



5.6.2 Receiving jobs in the Print manager

The Print manager has a hot folder which it checks for newly arrived jobs. The jobs have to be TIFF pages, uncompressed or compressed with Packbits, CCITT G4, LZW or CCITT G3-1D. The received jobs will automatically appear in the job list, so the fact that there are two programs working together, even on different computers, will be completely transparent from the Client workstation.

Pages coming from the Cascade Server will contain additional data, which helps the Print manager recombine them as jobs, recognize their colors, etc. Pages coming from third party applications will be shown as different jobs.

5.6.3 Starting the imaging

Once received, the job will start to be imaged automatically, provided that all the program parts are installed and the print engine is ready – no user intervention is needed.

At this point, the Print manager will be in one of the following states:

- The job is being printed. Status bar message: "Imaging".
- The job is waiting in the queue because the Print manager was paused. Status bar message: "Printing paused".
- The job cannot be printed because the engine is not in a Ready state. Status bar message: "Engine not found" (in case of EtherSetter interface the "Searching for EtherSetter box" message will also appear) or "Engine error".
- The job cannot be printed because there is no connection with the Print manager. Status bar message: "No Print manager".

5.6.4 Pause mode

Stop Print manager by clicking on and highlighting its icon in the *Print manager* docker (if there is more than one Print manager in the Cascade system) and then clicking on the *Pause* button in the toolbar. In this state the Print manager does not send anything to the engine, allowing time to arrange jobs, check the print engine, wait for a confirmation, etc. The only way to leave this state is by clicking the *Start* button. It will continue to receive jobs that are sent to it and Cascade will continue to process jobs and put them safely into the Print manager queue. They will not be imaged until the *Start* button is pressed.

Note: If there is more than one Print manager, each of them has its own state; stopping one will not stop the others.

Print manager will automatically enter *Pause* mode if:

- On startup it detects that there are jobs in the queue,
- A print engine error occurs,
- The last printed job was marked either with a *Cut* flag or *Stop after page* flag.

The Start and Pause buttons change the state of a Print manager rather than of the selected job(s).

5.6.5 Changing the job list

The job list in the Print manager window can be manipulated by the user in multiple ways. It is possible to:

- **Un-check** (in order to not print) or **check** (in order to re-print) entire jobs or pages of the jobs in the list;
- **Delete** pages or jobs by selecting them and pressing the *Delete* button;
- **Move jobs** in the list to change their orders with drag & drop;
- **Move pages** with drag & drop, including from job to job;

The tick mark near the job or page icon shows whether the page is ready for imaging or not. By default the jobs/pages are always ticked when they arrive in the list (i.e. they will be printed without user intervention), but:

- they can be un-ticked by the user in order to prevent printing a page at all, or to wait for a confirmation,
- pages are progressively un-ticked by the Print manager as they are imaged.

After a page is imaged, the Print manager will search for the first ticked page in the list, and will start to image it. As they are progressively un-ticked, the pages will be imaged in their natural order, except when the list has been changed by the user:

- a job has been dragged and dropped in front of the currently imaged page,
- the currently imaged job has been dragged behind another job,
- a page or job has been ticked before the currently imaged page.

5.6.6 Finishing the imaging

If a page has been imaged, the container job will be checked for removal. A job is removed from the list when one of its pages finished imaging successfully, and there are no more checked pages in the job.
This means that:

- A job may be removed even if some of its pages may not have been imaged at all (if they were unchecked by the operator),
- Unchecked jobs can stay in the list indefinitely, waiting to be checked.

The imaged jobs will be stored in the History, available under the History node of the Print manager window, grouped based on the year, month and day of printing. These jobs then can be:

- Previewed again by the *View* button (located on the toolbar of the Print manager docker),
- Imaged again by the *Reprint* button (also on the toolbar of the docker),
- Searched for in the record of the Print manager even if the job has been physically erased from the hard disk – information like name, size, color, date will be stored and never erased.

5.6.7 Commands and job flags

Jobs or pages of the jobs can be marked with the following flags:

- **Mirror** flag prints the pages of the jobs mirrored in the fast scan direction (wrong reading);
- **Negative** flag prints the pages in negative;
- **Cut after page** flag will cut the media after printing the marked page or the last page of the marked job. The media will be cut and the Print manager go into *Pause* status;
- **Stop after page** flag will put the Print manager into *Pause* status.

The mirror and negative flags will be passed to the driver, which will try to apply them at hardware level if available (e.g. Agfa imagesetters support both mirrored and negative imaging), otherwise they will be applied directly to the image data.
There are a few additional commands in the Print manager:

- **Cut the media** manually by clicking the *Cut* button,
- **Reset** the print engine with the *Reset* button,
- **Edit the settings** of the print engine by clicking the *Engine properties* button.

Note that some of these features may not be available on all machines.

5.6.8 Print manager history

Printed jobs are held in the History for a preset period (see chapter *7.1 Configuration ‹page 73›* about the cleanup strategies of the Print manager). Whilst they are held, they can be reprinted entirely or partially, with no need to re-rip them.

A full list of all the printed jobs (containing their characteristics, such as the size of the job, the date it was printed, etc.) is never deleted (as it occupies insignificant disc space), but is stored as a permanent archive of all the jobs imaged through the Cascade Print manager. Once the actual job data has been deleted from the history, its listing will appear as grayed out; these files cannot be reprinted.

To view or reprint jobs or pages, select them in the history list, and then click the *View* or *Reprint* buttons on the toolbar. This is possible only if the jobs are still on the hard disk (do not appear as grayed out in the list).

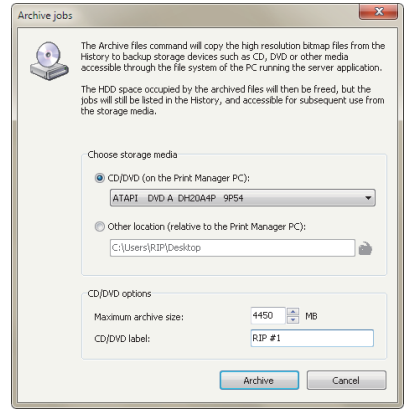
If the media saving has grouped two separations into one TIFF (for example, a cyan and a magenta plate together), then it will not be possible to view it as a single color page. However, if the plates were kept separately, the job will be recombined exactly as the original one was.

5.6.9 Archiving files

Files from the History can be archived to DVD. The archived job will appear in the History with a DVD icon, and will be available for reprint or viewing like the regular History jobs, but at any attempt to access them a window will appear asking for the right DVD to be inserted into the PC.

To archive jobs from the History, select years, months, days, jobs or pages of jobs, and then click the *Archive* button. The *Archive jobs* window will appear. Choose the DVD writer drive you want to use, the maximum archive size (i.e. the size of the DVD), and a label that you will use to identify the DVD later, then click the *Archive* button.

If the selected jobs do not fit on the DVD, they will be archived only partially. You can then continue archiving the selected jobs by inserting another blank DVD, the previously archived jobs will not be archived again.


Archive jobs
The Archive files command will copy the high resolution bitmap files from the History to backup storage devices such as CD, DVD or other media accessible through the file system of the PC running the server application.
The HDD space occupied by the archived files will then be freed, but the jobs will still be listed in the History, and accessible for subsequent use from the storage media.
Choose storage media
CD/DVD (on the Print Manager PC):
ATAPI DVD A DH20A4P 9P54
Other location (relative to the Print Manager PC):
C:\Users\RIP\Desktop
CD/DVD options
Maximum archive size:
4450
MB
CD/DVD label:
RIP #1
Archive
Cancel

5.6.10 Cassette manager

The Cassette manager toolbar can be shown or hidden by the *Show cassette manager* button on the toolbar of the *Print manager* docker.

The Cassette manager is particularly useful if the print engine is roll fed. It shows the amount of media remaining in the supply cassette, as well as the amount of media inserted in the take-up cassette (on engines with online processor, this usually shows the amount of media on the bridge).

When loading a new roll of media, be sure to enter the amount of loaded media by entering the number in the *Supply cassette* box, and then pressing Enter.

Note that Cassette manager functionality is print engine dependent and may not, or only partially, work on some engines.

5.6.11 Hide default video mode button

The video mode (right reading, wrong reading, positive and negative) is shown as a job flag by the Print manager. However, to avoid overcrowded flag lists, but also to emphasize jobs which have unusual video modes, checking the *Hide default video mode* button will show the video mode flag only if it is different from the default job style's video mode.

For example, if the default job style is right reading and positive, then an 'E' sign should appear near the jobs (i.e. the default video mode flag). However, if this button is checked, the flag will disappear. All the other video modes used, that are different from the video mode of the default job style (in this case mirrored, negative or both), will be shown regardless of the state of this button.

6 Configuring Cascade

6.1 PRINTER PROFILES

A physical printing device appears in the Cascade system as one *device* and several *printer profiles* belonging to it (represented in the tree view control of the Printer profiles docker as a device node and printer profile child nodes):

- The **device** item holds the global settings of the physical device: the device name, the connection details of the Print manager and the hot folder location where the TIFF files will be created.
- The **printer profile** items hold all the other settings of the device (resolution, media size, page placement and device specific settings). There is a separate printer profile for each set of settings.

Typical reasons for having several printer profiles for one device:

- different resolutions;
- different media sizes;
- composite and monochrome modes supported (e.g. an inkjet printer used both with paper as composite device and with inkjet film as monochrome device);
- different device settings needed (e.g. different laser intensities needed for two types of media).

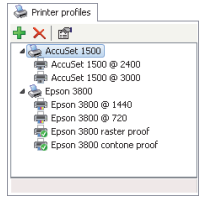
The approach of having printer profiles (rather than just moving all settings to the job styles) is necessary from several points of views, but the main consideration is the media saving feature. Two pages can be printed on the same piece of media only if they have the same resolution, laser intensity etc. (though on some drum machines it is possible to image twice, with different parameters, on the same piece of media, but that is an exception to the rule), and the point of media saving is to fully exploit the media at a given size. Therefore media saving can only work efficiently if one physical print engine is treated as several logical printers, each one with its own media saving system.

For example, if four jobs are sent (in any order), two of them at 1200 dpi and the other two at 2400 dpi, the first two will be grouped together by the media saving of the 1200 dpi profile, the same will happen to the other two on the 2400 dpi profile. Then the two profiles will send the jobs to the same Print manager, so they will eventually appear in the same list. The jobs will then be printed on two pieces of media, at the correct resolutions.

Normally printer profiles are generated using the *Add print engine wizard* (which starts automatically on the first run of Cascade) or by the profiling

wizards (which create proof profiles). It is strongly recommended that the wizards are used rather than manually adding profiles; add profiles manually only if the exact meanings of all available settings are clear.

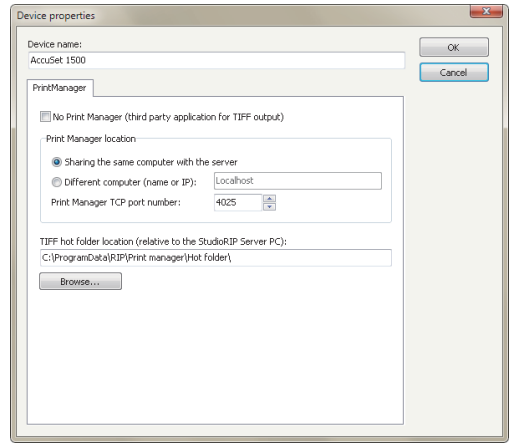
Adding a new device is only possible using the *Add print engine wizard*. The *Add printer profile* button will add a printer profile to the currently selected device. Removing or editing devices or profiles are possible using the *Remove printer profile* and *Edit printer profile* buttons.



6.1.1 Device properties dialog box

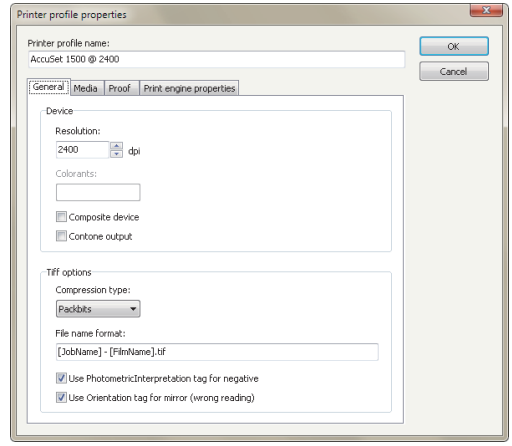
To edit the properties of a device, select the device item in the *Printer profiles* docker (i.e. the parent node of the printer profiles) and click the *Properties* button. Note that double clicking the device item will expand or collapse the printer profiles rather than opening the properties dialog.
The device properties are as follows:

- **Device name:** this is the name that identifies the device, and is used by the *Print manager* docker (each device will have one item, having the name specified here).
- **No Print manager:** tick this option if no Print manager will be used; in this case, the Print manager location box will be grayed out.
- **Print manager location:** controls how the Server connects to the Print manager (if it does);
  - choose *Sharing the same computer with the Server* option if the Print manager and the Server are on the same PC, and therefore no IP address is needed;
  - specify the host name or IP address of the computer running the Print manager to connect to if the Print manager and the Server are on different PCs;
  - specify the TCP port number the Print manager is listening on for incoming connections;
- **Print manager hot folder path:** specify the folder that the 1-bit TIFF files will be dropped into. When using third party TIFF catcher software, this is the place to specify as the location of the TIFF catcher's hot folder. Note that this path is relative to the Server PC's file structure.



6.1.2 Printer profile properties dialog box

To edit the properties of a printer profile, select the printer profile item in the *Printer profiles* docker (i.e. the child node of a device) and click the *Properties* button. You can also double click the printer profile item.
The printer profile properties are as follows:



- **Printer profile name:** this is the name which identifies the printer profile, and is used by the *Job style* and other windows;

- **Resolution:** the device resolution, in dpi. In case of raster proof profiles, it is the resolution of the *target* device (typically an imagesetter or CTP) rather than the one of the proofer (typically an inkjet printer).
- **Colorants:** applies to composite devices only, specifies the colorants (inks/toners) of the device which can be used by Cascade: *C* (cyan), *M* (magenta), *Y* (yellow), *K* (black), *c* (light cyan), *m* (light magenta), *k* (light black or gray), *l* (light light black or light gray). In addition, the colorants field may have a '*2*' suffix (e.g. *CMYKcm2*), specifying the ability of the device to use a second, smaller dot (droplet) size on the given resolution, improving the quality of the print in highlights. For example, the Epson Stylus Pro series will use two droplet sizes on 720 dpi (12.5 pl and 3.5 pl), but only 3.5 pl on 1440 dpi, resulting in a '*2*' suffix on 720 dpi and no suffix on 1440 dpi.
- **Composite device:** specifies whether the device is used as separations device (typically imagesetter or CTP), or as composite (color) device (typically inkjet printers). If you want to use a color inkjet printer as separations device (e.g. printing on transparency film for screen printing), you will have to turn this option off.
- **Contone output:** specifies whether the device driver expects continuous tone data (i.e. without halftoning), either because the device is able to print shades of colorants directly, or – more likely – the halftoning process is done at TIFF catcher or driver level. For example, the OKI laser printer driver of Cascade expects contone data, as a special high frequency 32-level halftone is used.
- **Compression type:** this option is enabled only if the *TIFF output* feature is enabled in the Cascade license (otherwise the generated TIFF file will be encrypted, and only the Print manger will be able to read it); having the TIFF output feature enabled, standard TIFF compression types can be chosen (CCITT G4, CCITT G3-1D, LZW, Packbits), a special Cascade compression type designed for 16-bit contone data (Packwords), as well as no compression.
- **File name format:** defines the naming convention of the output TIFF files – especially useful with third party TIFF catchers which may expect a given convention. The format string contain variable fields (such as job name, sheet name, ink name), written as the name of the field in brackets, e.g. [JobName]. The following fields are defined:

  - *JobName:* the name of the job, as it appears in the job browser;
  - *JobShort:* the name of the job with any non-alphanumeric characters removed (including spaces), resulting in a name containing only letters or digits;
  - *FilmName:* the name of the piece of media that belongs to the printed TIFF, as appears under the *Media* node in the job browser.
  - *FilmShort:* same as above, but alphanumeric characters only (see also *JobShort*);
  - *FilmIndex:* the index or the output TIFF file within the job. For example, if the film saving has grouped a CMYK job into two TIFF files, one containing the cyan and magenta plates, the other the yellow and black plates, the first TIFF file will have the index 1, and second one will have the index 2.
  - *InkName:* the full name of the ink (e.g. 'Cyan' or 'Pantone 368 C');
  - *InkShort:* the short name of the ink (e.g. 'C' or 'P368C');
  - Number suffixes for text fields: each text field can have a number attached at the end, this will ensure that the resulting string will have a fixed length (longer strings will be truncated, shorter strings will be padded with spaces). Example: [JobName6] will return a job name of exactly 6 characters.
  - Number suffixes for number fields: number fields can have a number attached at the end, which will add leading zeroes if the number has less digits than specified. Example: [FilmIndex3] will return '001' for the first TIFF file.

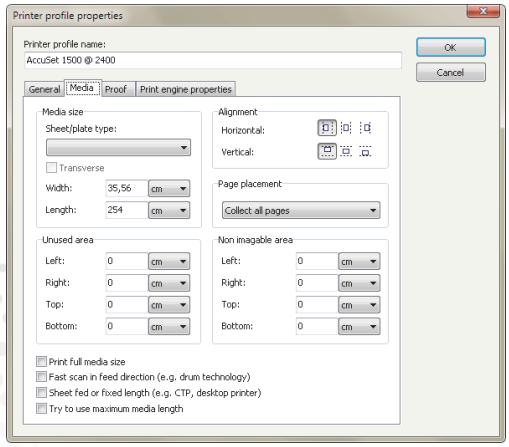
- **Use PhotometricInterpretation tag for negative:** if negative pages are sent out, this option will specify whether Cascade will invert the information (resulting in a baseline TIFF containing inverted information, which can be read by all TIFF readers, guaranteed), or it will be sent out as positive data but with the PhotometricInterpretation tag set to negative (resulting in high speed and efficiency, but possible incompatibility, if the TIFF reader cannot handle this tag correctly). Possible reasons for unchecking this option:

  - Use of third party TIFF catchers, which may not be compatible with this tag;
  - Only the job area (rather than the entire film/plate) needs to be inverted. Using the tag, the print engine may be instructed to work in negative mode (e.g. Agfa imagesetters), inverting the entire imaged area (e.g. film width) rather than just the job.

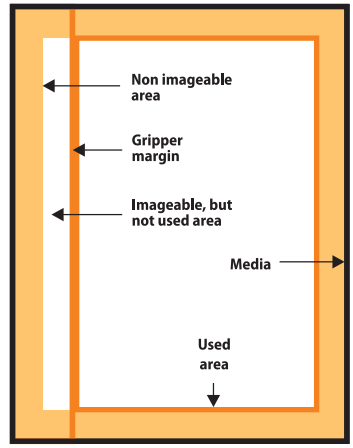
- **Use Orientation tag for wrong reading:** if mirrored pages are sent out, this option will specify whether the mirroring will be rendered by the Cascade (resulting in a baseline TIFF containing mirrored information, which can be read by all TIFF readers, guaranteed), or it will be sent

out as right reading data but with the Orientation tag set to mirrored (resulting in higher speed and efficiency, but possible incompatibility, if the TIFF reader cannot handle this tag correctly). If you use third party TIFF catchers, you may want to uncheck this option.

- **Sheet/plate type:** contains a list of predefined page sizes. Choosing a predefined page size will fill the width and length fields automatically.
- **Transverse:** used in conjunction with sheet/plate type, swapping the width and height of the selected sheet/plate.
- **Width:** the width of the media used with the current profile, perpendicular to the feed direction. In case of roll fed media, this will be the width of the roll.
- **Length:** the length of the media used with the current profile, in feed direction:
  - for a sheet fed machine, set the height of the sheet/plate;
  - for a roll fed machine with limited image length (e.g. drum imagesetter), set the drum size;
  - for roll fed machine with unlimited image length (e.g. capstan imagsetter), set zero;
- **Page** placement options sets whether two pages, coming from the same job, or from different jobs, can be printed on the same piece of media. Useful with imagesetters or large format inkjet printers.



- **Unused area:** specifies the area, measured from the *edge of the media* (rather than from the imageable area), which for various reasons is not intended to be printed (irrespective of imageable or not). The grip margin is a typical example of this. Setting a non-zero value will set the *Print full media size* option, see below.
- **Non-imageable area:** specifies the area, measured from the edge of the media, which cannot be imaged by the print engine. An exception is the case of the roll fed machines, where *Left* and *Right* specify the non imageable margins, but *Top* and *Bottom* act as inter-page gaps. Setting a non-zero value will set the *Print full media size* option, see below.
- **Horizontal and vertical alignment:** specifies the alignment of the job on the media horizontally (left, center, right) and vertically (top, center, bottom). Setting a non-zero value will set the *Print full media size* option, see below.
- **Print full media size:** specifies whether Cascade sends only the processed image information to the print engine (letting the print engine place it on the media based on its internal settings), or sends the full imageable area (thereby controlling the positioning of the image on the media).
  - check this option if Cascade will control the positioning directly by using the positioning options (unused, non-imageable area, alignments);
  - uncheck this option if the engine settings control the positioning, and the positioning controls are used only to reflect onscreen the positioning done by the engine.



The margin and alignment settings will be effective on the output only if the *Print full media size* option is ticked, otherwise they will only modify the preview.

To understand this, an explanation of how Cascade places the image on the print area is necessary. Some print engines provide limited or no control for positioning the image on the media, therefore Cascade offers a simple but effective way to control the position of the image: imaging the maximum imageable area, placing the image on this area according to the settings, and leaving the areas outside of the image unexposed (or fully exposed, in case of negative printing).
However, this method has several disadvantages:

- Imaging the maximum area (including the white borders) is usually slower than imaging just the effective image. Setting up the print engine (if possible) might yield better speed.
- Cascade performance might also be affected by creating larger output files.
- Setting up the margins with wrong values might cause inaccurate placement or imaging errors.

Therefore, on most print engines the *Print full media size* option is turned off by default. On CTP machines, which need accurate placement of the image on the plate, the recommended setting is on.

- **Fast scan in feed direction:** on drum engines the job width is, confusingly, measured along the media axis (i.e. the jobs are 90° rotated from their normal position), so this option needs to be checked in order to have the automatic rotation, media saving and media count functionalities working properly.
  - Check this option for drum engines, where the width of the job is measured along the media length axis.
  - Leave it unchecked for capstan machines or inkjet printers, where the length of the job is measured along the media length axis.
- **Sheet fed or fixed length:** specifies whether the print engine uses variable media lengths (typically roll fed engines) or fixed lengths (typically sheet fed or CTP).
- **Try to use maximum media length:** this option is useful for drum machines, where the maximum engine throughput speed is only achieved if a full drum is imaged at once. For example, with an A2 engine printing A3 pages, the speed will double if two A3 pages are printed in one imaging.

Many drum machines have geometrical distortions. Using this feature on these machines will cause separation pages to have registration errors. It may be advisable to print more slowly but more precisely by turning this feature off.

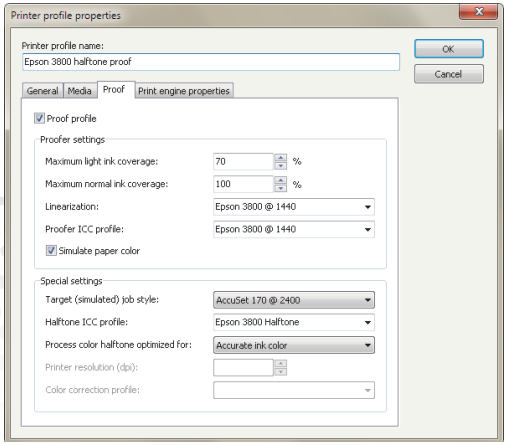
- **Proof profile:** is checked only for proof profiles. Proof profiles are created by the *Raster, Halftone* and *Contone proof wizard*s, and will output special TIFF files, containing extra color management information that will be used by the Print manager.
- **Maximum light ink coverage:** specifies the maximum permitted coverage (density) of a light ink (e.g. light cyan, typically used by inkjet printers). Increasing this value to 100% will improve quality, but may cause ink flow problems (as the paper may not support too much ink). The default value of 70% will, on most inkjet printers, avoid ink flow problems.
- **Maximum normal ink coverage:** specifies the maximum permitted coverage (density) of a normal ink (e.g. cyan). If on a given resolution the density of the 100% tints are unnecessarily high (causing ink flow problems in mixed colors), reduce this value – if possible, without limiting the gamut of the printer
- **Linearization:** holds the linearization information of a proofer device at a specific resolution. A linearization profile can be created by running the *Proofer linearization wizard*. A linearization file will be necessary to run the *Raster, Halftone* or *Contone proof wizard*s, and will be copied to the resulting proof profiles.
- **Proofer ICC profile:** the ICC profile of the proofer in contone mode. It is created by the *Contone proof wizard*, and for accurate spot color reproduction it is recommended that it is created before running the *Raster proof wizard*. It must be created before running the *Halftone proof wizard*.

As Cascade has its own rasterization, linearization and ink management modules, it doesn't make any sense to use ICC profiles created by other applications (the result will certainly be inaccurate).

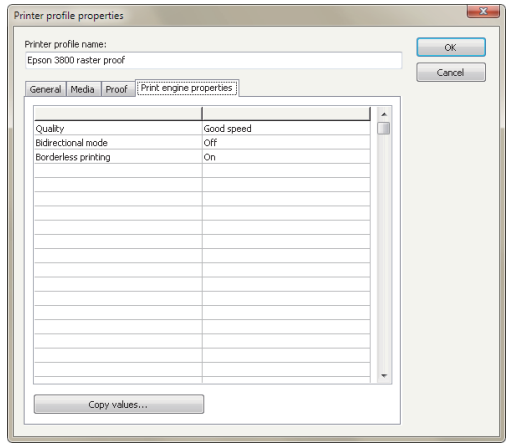
- **Target (simulated) job style:** specifies the job style that a halftone proof simulates. It is set up by the *Halftone proof wizard*, changing it may af-

fect proofing accuracy. For contone proofs this field will be set to *(Halftone proof)*.

- **Halftone ICC profile:** specifies the ICC profile of the proofer in halftone mode for the given target job style. It is set up by the *Halftone proof wizard,* and if the screen set-tings of the target job style are changed, it is recommended that the *Halftone proof wizard* is rerun, creating a new halftone ICC profile.
- **Process color halftone optimized for:** specifies the sharpness and color accuracy of halftone dots. It is set up by the *Halftone proof wizard,* changing it may affect proofing accuracy. For details, see *10.2.4 Halftone proof wizard ‹page 117›*.
- **Simulate paper color:** specifies whether the proof should simulate the color of the target paper (typically printing a yellowish tint on the bright white proofing paper in order to match the color of the offset paper). Unchecking this option is not a correct procedure, as the proof will still remain absolute (possibly resulting in visible white spots in light areas – the light colors will still have the paper color counted in), but many users prefer it.
- **Printer resolution:** the real resolution of the proof printer for raster proof profiles. Note that the resolution of the printer profile (as specified in the Media tab) is the resolution of the target device (i.e. imagesetter or CTP) rather than the real proofer device (i.e. inkjet printer).
- **Color correction profile:** holds the profiling information for a specific combination of target device, proofer device, screen and calibration settings. It can be created by running the *Color correction wizard*.
- **Print engine properties:** before imaging any job, Print manager checks the job for any engine configuration data included. If configuration data is found, it will set up the engine prior to imaging the job. The print engine properties table in the *Printer profile* dialog serves this purpose: any engine configuration information set up here will be saved into the TIFF files going through the given profile, in order to be passed to the Print manager. For example, a profile can be set up to switch off the bi-directional printing on an Epson printer for all jobs printed through it:



- click the *Copy values…* button (which will be enabled only if the printer is online and in *Ready* state),
- tick the check box of the *Bi-directional mode* parameter,
- set the parameter to *Off,*
- click the *OK* button,
- the selected parameter/value pair (Bi-directional mode = off) will be stored in the table, and applied to all jobs printed from this moment on through this profile.



6.2 JOB STYLES

Job styles hold the parameters of how each workflow task (interpretation, trapping, proofing etc.) has to be done. It is similar to the *page setup* or *job ticket* concepts of other workflows.

Each job in Cascade has its job style information attached – either one of the defined job styles in the Cascade system, a job style loaded from file, or edited on per job level after a manual open command.

The rules of attaching job styles to jobs are as follows:

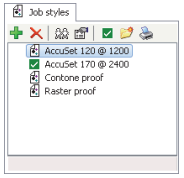
- For jobs coming through a Cascade printer, the job style that the printer belongs to will be attached to the job. For example, printing to the *Cascade – Offset 170 lpi* printer will attach the job style called *Offset 170 lpi* to the opened job.
- For jobs dropped in a subfolder of the hot folder – see *3.3 Setting up the hot folders ‹page 25›* – the job style that the hot folder belongs to will be attached to the job. For example, placing a file into the subfolder called *Offset 170 lpi* will attach the job style called *Offset 170 lpi* to the opened job.
- For jobs opened with the *Open* command in a Client, the job style window will appear (if the *Ask for job style on open* option in the *Client settings* is checked), and the settings specified in this instance of the *Job style* dialog box will be applied (these settings can be temporary, in which case there is no need to save them).

In most cases the job styles are stored as a simple list, but in the case of a large number of job styles, they can be structured in groups: a job style can be either in the root (i.e. not belonging to any group), or can be placed into a job style group.
If a job style is located in a job style group:

- The name of the job style, as referenced from other dialogs of Cascade, will have a suffix made of the group and a backslash character (e.g. *MyGroup\MyJobStyle*).
- The hot folder system will follow the group structure, e.g. placing *MyJobStyle* into the a job style group called *MyGroup,* the hot folder belonging to the job style will become *Hot folder\MyGroup\MyJobStyle*, relative to the Cascade shared documents folder, as specified during the setup process.

6.2.1 Job styles manager

The job styles are managed in the *Job styles* window. Though the job styles are arranged and displayed in a tree structure (job styles belonging to a group will be displayed under the tree nodes representing the job style groups), in most cases the tree structure will look like a simple list: by default no job style groups are defined, and therefore the job styles will be displayed in the root of the tree.
The following operations are allowed:



- **Add, remove** or **edit** job styles by clicking the appropriate buttons in the toolbar of the *Job styles* docker.
- **Create a copy** of a job style, useful to create a job style similar to a reference.
- **Set a job style as the default** by selecting it and clicking on the *Set as default* button. A checkmark in a green square to the left of a job style name indicates that it is selected as the default job style.
- **Create a shortcut** to the hot folder of the selected job style by the *Create shortcut to hot folder* button. The shortcut will be created to the desktop. If a shortcut with the same name exists, it will be overwritten.
- **Print a calibration page** with the settings of the selected style by the *Print calibration page* button.

When adding or editing a job style, the *Job style* window will appear.

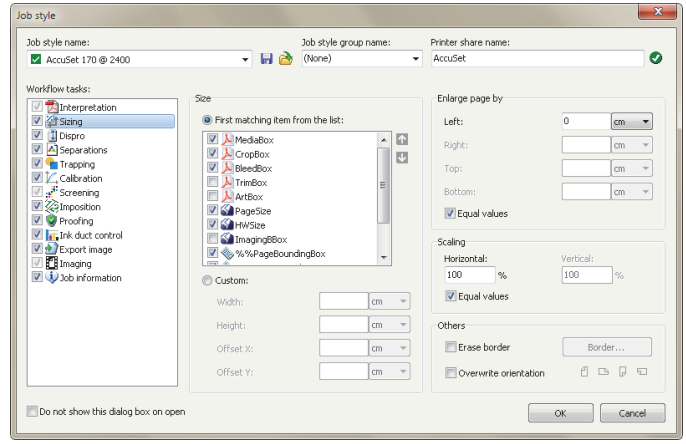
6.2.2 Job style window

The job style window will appear whenever a job style is created or modified, as well as when a job is opened by the *Open* command, and the *Ask for job style on open* option is checked in the *Client options* dialog.
The job style window has the following controls:

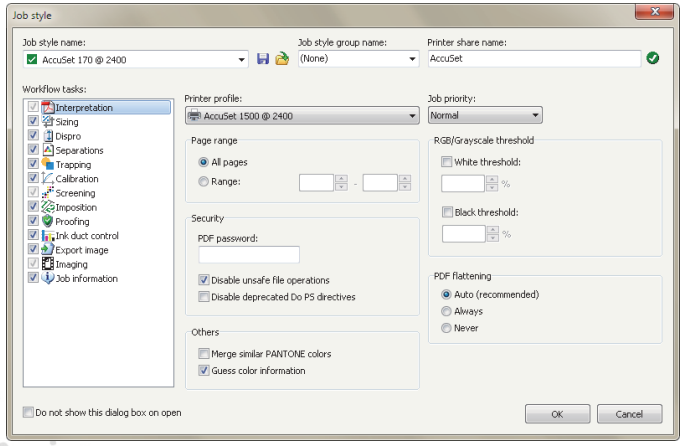
- **Job style name:** the name of the job style, as it will displayed in the *Job style manager,* and as the Cascade printers will be created.
- **Job style group name:** the name of the job style group that the job style belongs to. By default it is set to the value *None* (i.e. the job style does not belong to any groups). To move the job style into an existing group, choose the given group from the list. To create a new group that the job style should belong to, type the name of the new group into this field.
- **Printer share name:** the share name of the Cascade printer, as the network workstations will see it. If PCs with older operating systems or Mac computers are used in the network, it is recommended that a short name is chosen (maximum 8 characters, without special characters). The icon in the right of the box will show whether the name is considered compatible with older systems.
- **Workflow tasks:** contains the list of the available tasks that will be performed for the jobs opened with the given job style. Only the checked

tasks (i.e. with the check box in the left of the task name ticked) will be executed. Certain tasks are grayed out because they must be (e.g. interpretation) or cannot be (e.g. screening for a contone job) executed in the given circumstances. Selecting a workflow task (i.e. clicking on the name of the task) will show the properties of that task in the right side of the *Job style* window.

- **Workflow task properties:** will show the properties of the selected workflow task. Each workflow task has its own set of properties. For a detailed description of the properties of each workflow task, see the following sections.
- **Do not show this dialog box on open:** will uncheck the *Ask for job style on open* option in the *Client options* dialog; as a result, the job style window will not appear when executing the *Open* command – the default job style will be used instead.



6.2.3 Interpretation task



- **Printer profile:** the profiles available in the system will be listed here; note that, by choosing one of the profiles, the user effectively selects resolution and media width;
- **Job priority:** the priority of the opened job. Only one job is processed at a time in Cascade, and jobs are never interrupted – however, in case of queued jobs, jobs sent to job styles with higher priority selected will be processed first.
- **Page range:** specifies the pages of PDF files to process (by default all pages will be processed).
- **RGB/Grayscale threshold:** will replace all colors under a certain percentage with white and above a certain percentage with black. In case of RGB colors, the grayscale equivalent of the color will be considered. It is useful for achieving pure black for texts when the *Convert RGB black to PS black* of the *Separations* task will not work due to color management issues (e.g. choosing a threshold of 98% will usually transform the color managed RGB black into pure RGB black).
- **PDF password:** the user or owner password to be used to open a password protected PDF file.
- **Disable unsafe file operations:** instructs the PS interpreter module to ignore any file operations that may harm the computer (by design PostScript files are allowed to change or delete files in the system).
- **Disable deprecated Do PS directives:** Do PS directives allow applications embed native PS/EPS code in a PDF document. Since PS/EPS code may potentially harm your computer (see Disable unsafe file operations) these directives are deprecated, hence PDF reference recommends avoiding their usage.
- **Merge similar Pantone colors:** corrects for the very common error of mistakenly including the same Pantone color with slightly different names (e.g. PANTONE 339 C vs. PANTONE 339 CV). If plates with such names are detected, Cascade will automatically merge these plates into one single plate.
- **Guess color information:** if this option is on, the RIP will try to guess how to assign color information to the pages and how to group the separations in composite pages – in cases of PostScript files with poor or bad page and color information. This may not always work correctly, so

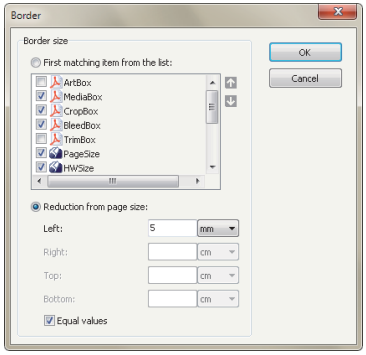
if using programs which generate good PostScript files, the use of this option should not be necessary.

- **PDF flattening:** the transparency flattening policy of Cascade. It is recommended that it is left on 'Auto' to allow Cascade to check whether the job contains transparency or not. However, if the PDF contains either transparency the Cascade checking mechanism cannot detect or new features which are beyond current PDF handling implementation, it can be set temporarily to 'Always'. Skipping the transparency check by setting the usage to 'Never' may slightly speed up the job processing but is not recommended for regular use.

6.2.4 Sizing task

Turning the sizing task off will instruct Cascade to use the default page size. Turning it on, the following options will be available:

- **Size:** defines the entire processed size of the job. If the imposition task is turned off, this is the displayed and printed size of the job. If the imposition task is turned on, this may become (depending on the imposition task settings) the bleed size, i.e. displayed and printed only if the imposition allows it, see more in *8.6 Bleed ‹page 91›*.
- **First matching item from the list:** will extract the size of the file from the various size declarations of the PostScript, PDF and EPS files. As their use by the various DTP and pre-press applications isn't very consistent, Cascade allows the user to fine tune the size extraction procedure to get the best possible result with their applications. Cascade will search for the first definition in the list that is ticked and also present in the PS/PDF/EPS file. The user can change the order of the size definitions, and can check or uncheck them. By default, the MediaBox definition is the most desirable one (first in the list and checked), but if it is not present in the file, Cascade will search for the CropBox, BleedBox, PageSize etc. definitions. If no match is found, the Custom size will be defaulted *(see below)*.



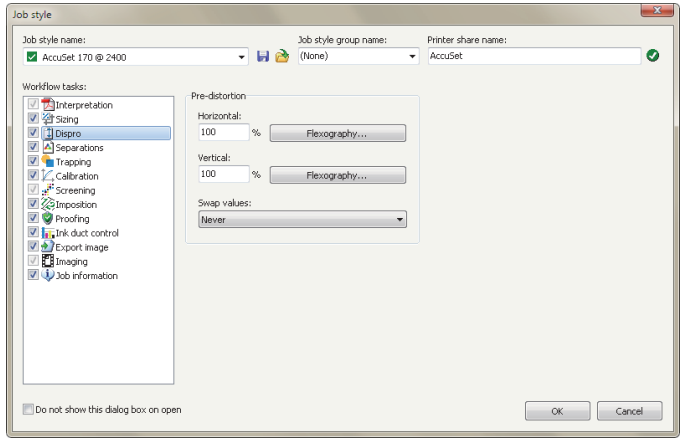
- **Custom:** will set the page size directly, ignoring the page size definitions of the file. The *Width* and *Height* fields will define the size of the box, while the *OffsetX* and *OffsetY* fields will define the position of the box on the page (negative values allowed).
- **Enlarge page by:** will enlarge the extracted/defined size. Useful for files with missing bleed definition, e.g. if the defined size is the trim size, enlarging the defined size by 5 mm will provide the needed bleed.
- **Scaling:** resizes the job by a given percent (100% meaning no resize). Both page size and page contents will be resized.
- **Erase border:** sets the border the Cascade won't mark outside – either by using the *First matching item from the list* or specifying custom values (press the *Border…* button to select the appropriate option). If the option is unchecked, no portions will be erased.
- **Overwrite orientation:** the job will be rendered by the specified orientation, rather than using the one specified in the *Rotate* entry of the Page object.

Note that the following order is observed beetween the different sizing tasks: *Size → Overwrite orientation → Scaling → Enlarge page by → Erase border*. That is, scaling applies on the already rotated page, etc.

6.2.5 Dispro task

The dispro task will control the pre-distortion of the job, necessary in flexography, correcting the mechanical distortions of engines, etc. Turning off this task will cause no pre-distortion. Turning it on, the following options will be available:

- **Horizontal:** acts in fast scan direction (horizontally in the screen preview);
- **Vertical:** acts in slow scan direction (vertically in the screen preview).
- **Swap values:** will swap the horizontal and vertical distortion values if the defined condition is true: the job is portrait, landscape (useful for flexography) or rotated automatically (useful for correcting the mechanical distortions of the engine).
- **Flexography buttons:** bring up a distortion calculator for flexography which makes dispro calculations easier.



6.2.6 Separations task

If turned off, the output will be grayscale (even for RGB/CMYK jobs), otherwise it will control the process of color separations with the following options:

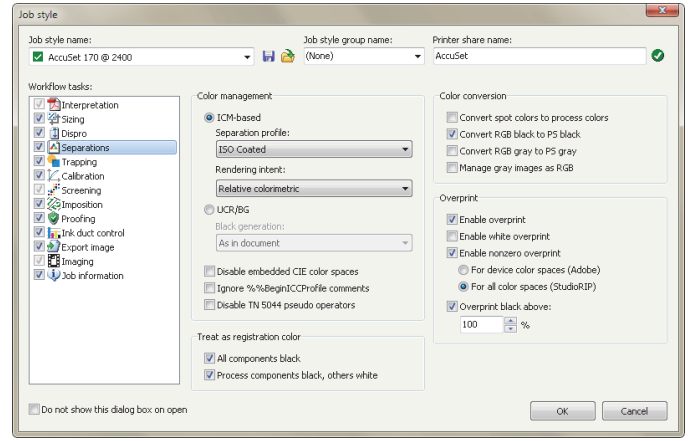
- **ICM based:** the color separation will be based on ICC/ICM files. This setting is highly recommended.
- **Separation profile** will specify which ICC/ICM file to use when RGB, Lab or spot colors are converted to CMYK; manage the separation profiles in the *Color profiles* window;

This separation profile will be used as the target (simulated) ICC profile for contone proofing.

- **Rendering intent** specifies the color conversion strategy, using the four standard values: Absolute Colorimetric, Saturation, *Relative Colorimetric,* Perceptual. These settings will influence only the colors outside of the gamut or close to it (i.e. the colors that cannot be accurately reproduced by the given colorants and printing technology), but most of the colors of an average document will not be affected by this setting. For generic use, *Relative colorimetric* is recommended.

CMYK information in the PS/PDF/EPS file will not be influenced by the color management settings. The ICC/ICM file will be used only for converting RGB, Lab or spot colors to CMYK.

- **UCR/BG:** the separation will be based on simple undercolor removal and black generation formulas using customizable black generation parameter. Not recommended, as the result is much inferior compared to ICM based separations.
- **Disable embedded CIE color spaces:** PS/PDF/EPS files can contain embedded color profiles that will control the color separation of one or more objects in the file (e.g. an RGB picture may contain an RGB profile of the digital camera that took the picture). Normally the interpreter will transform these colors into RGB or CMYK, which is then passed to the color management of Cascade. Disabling embedded CIE color spaces will pass these colors through unchanged, treating them as though they were RGB (for colors with 3 components) or CMYK (for colors with 4 components). Depending on the embedded color space, this can result in slight color differences (in most cases, as usually the conversion is between two color spaces of the same type, e.g. device RGB to sRGB), but also in completely wrong results (e.g. blue grass, in case of color spaces of different types).
- **Ignore %%BeginICCProfile comments:** Disables the automatic loading and use of an input color space that is contained in a PostScript file as DSC comments starting with the *%%BeginICCProfile* comment. ICC profiles are sometimes embedded by applications to convey the exact input color space allowing better color fidelity. Checking this option may result in improved performance at slightly reduced color fidelity.
- **Disable TN 5044 pseudo operators:** TN 5044 pseudo operators are not a part of the official PostScript specification, however they are defined in Technical Note #5044 Color Separation Conventions for PostScript



Language Programs. Having these operators enabled are required for some files from QuarkXPress, however some files from Corel 9 and Illustrator 8 will operate properly only if they are disabled.

- **Treat as registration color:** registration colors are special colors that are printed on all plates of a job. Normally they can be printed as such (being defined in the PS/PDF file as registration color), but some DTP applications and many designers prefer to draw registration or other prepress marks as C = M = Y = K = 100. Identifying registration colors is necessary for various reasons (they must be printed on spot color plates, trapping must be disabled for them), so Cascade offers the possibility to identify the two frequent cases of intended registration colors are real registration colors:
  - *All components black:* if checked, all colors with all colorants on 100% (e.g. C = M = Y = K = Pantone 123 C =100%) will be considered registration colors.
  - *Process components black, others white:* if checked, all colors with all process colorants on 100% and all other colorants on 0% (e.g. C = M = Y = K = 100%, Pantone 123 C = 0%) will be considered registration colors.

- **Convert spot colors to process colors**: if this is on, non-CMYK colors in a composite file will be automatically converted to CMYK, rather than printed as extra separations.
- **Convert RGB black to PS black** option will detect whether a vector object was intended to be black, but the program which generated the PostScript file was unable to handle CMYK, or by mistake an RGB black is present in a design; in either case the R = G = B = 0 colors will be converted to C = M = Y = 0, K = 100; this option only works when the *force nonzero overprint* option is checked.
- **Convert RGB gray to PS gray:** similar to the previous option, converting any R = G = B = *x* colors into C = M = Y = 0, K = *y*, where *y* is computed from *x*.
- **Manage gray images as RGB:** converts grayscale images to RGB (i.e. after a color separation resulting in grays achieved from CMY components). It may improve the quality of grayscale images in certain conditions.
- **Enable overprint:** enables overprint management for composite files (pre-separated files must have the overprint rendered during the separation process). Turning off this setting will disable overprinting in composite files.
- **Enable white overprint:** enables the overprint of white objects. In most cases white objects are set to be overprinted only by mistake (as the result is that they won't be printed), so keeping this option unchecked is recommended.
- **Force nonzero overprint:** in PS versions before 3015.102 an overprinted object leaves untouched only components that the current paint operation doesn't contain (e.g. painting with a spot color did not touch the CMYK components), but knocks out all components from the current paint operation (e.g. painting with C=100, M=Y=K=0 knocks out all CMYK components), while the expected behavior would be to leave all the zero components (M, Y and K) untouched. From the point of view of the DTP application, the workaround for this was to define special color spaces (in this example, a color space containing only a cyan component). However, from the RIP point of view it is possible to define the *Force nonzero overprint* option, which will knock out only the nonzero components (in case of C=100, M=Y=K=0, knocking out only the C, as the other 3 components are zero).
  - *For DeviceCMYK color space:* the Adobe definition of nonzero overprint, for the CMYK color space only.
  - *For all color spaces:* nonzero overprint for any color space.

- **Overprint black above…** option overrides the overprint settings of the PostScript jobs, and ensures that any black or dark gray vector objects (over the specified percentage) will be overprinted.

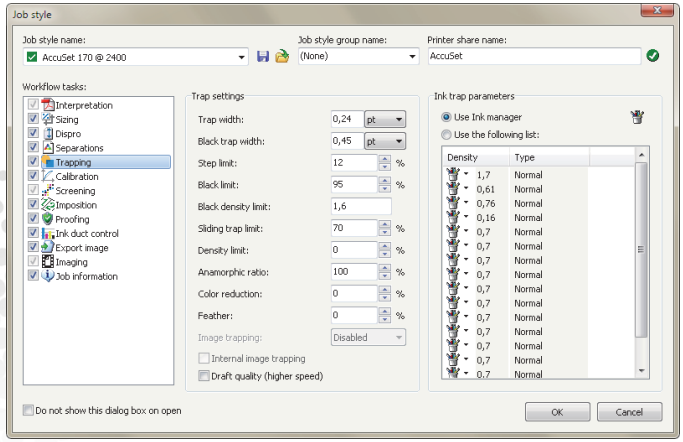
6.2.7 Trapping task

In high-quality reproduction of color documents, the gaps caused by the misregistration of the press are commonly avoided by creating an overlap, called a trap, between areas of adjacent color. The trapping parameters defined by the Level 3 revision of PostScript, as well as Cascade's proprietary parameters, are below:

- **Trap width:** the width of the traps for regular colors; see the exceptions below.
- **Black trap width:** the width of the trap when one of the adjacent colors is considered to be black (see definition of black below).
- **Step limit:** has an influence on deciding whether two adjacent colors need trapping or not. Increasing this number will cause certain colors not to be trapped.
- **Black limit:** specifies whether a tint can be considered black (and there-

fore trapped as black), assuming that its ink is dark enough to be considered black (see below). Typically tints over 95% are considered black.

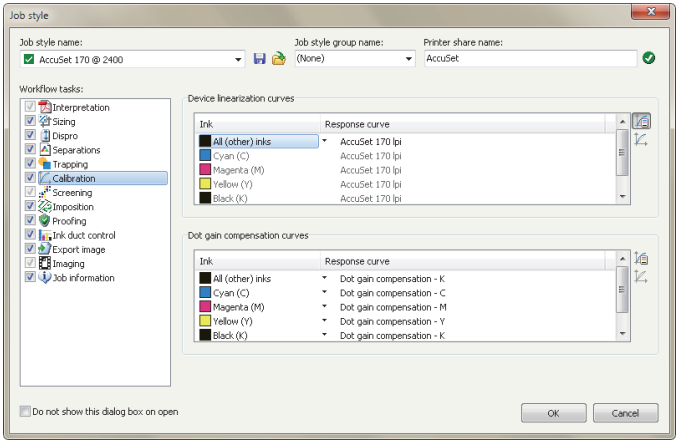
- **Black density limit:** if an ink has a neutral density above the value specified here, it will be considered black. Normally only very dark inks have to be considered black.
- **Sliding trap limit:** specifies when the trap will start to be shared between two adjacent colors: if the ratio between the neutral densities of the two colors is above this limit (i.e. the density of the two colors is close enough), instead of the light color trapping the dark one, they will share the trap (shifting the trap gradually instead of a jump when trapping vignettes). Increasing this value will tighten the transition area on vignette traps.
- **Density limit:** if a non-zero value is specified as the density limit, the density of the trap will be limited to the density of the original color increased by the value specified here (e.g. if the value specified is 70% and the density of the original color is 0.5, then the maximum density of the trap will be $0.5 \times 1.7 = 0.85$). If the density of the trap will exceed the specified value, the components of the trap colors will be proportionally reduced to match the maximum density.
- **Anamorphic ratio:** the misregistration in the X and Y directions in the printing process might be different. Cascade can compensate for this by applying different trapping in the X and Y directions. This value will specify the ratio of X and Y directions, in percentages (100% will mean equal trapping in X and Y directions).
- **Color reduction:** The visual impact of the trap can be minimized by reducing the density of the trap (i.e. the density of the resulting color in the trapped area) to match the original density (i.e. the density of the original color in the trapped area). This setting adjusts the trap color reduction with a continuous setting, from no reduction (0%) to full reduction, matching the original density (100%).
- **Image trapping:** not available in version 3.4. This setting will affect all the images (bitmaps) on the page in the same way:
  - **Disabled:** there will be no trapping between images and vectors;
  - **Spread:** the image will be spread to the vectors;
  - **Choke:** the image will be choked by the vectors;
  - **Centerline:** the image and vectors will share the trap.
- **Internal image trapping:** not available in version 3.4. Enabling it will enable trapping between the image elements. This setting may cause strange results, and it is recommended that it be used only in controlled situations.
- **Draft quality:** will increase the speed of trapping by doing the trapping between two objects with disregard to the presence of a third color (object) or the white background, while normally, at the expense of a lower speed, Cascade will adjust the trap shape to minimize the potential risks.
- **Use ink manager:** the ink definitions in Cascade hold the trapping parameters of each (density, opacity etc.). Checking this option, the trapping module will extract the parameters of the inks from the ink manager.
- **Use the following list:** allows the user to override the ink definitions in the ink manager for a specific job by defining the ink parameters for each ink, in the order they will appear in the *Separations* list of the job browser.



6.2.8 Calibration task

The calibration task applies the device linearization and dot gain compensation curves to the job. If turned off, no calibration will be applied over the job. There are two sets of curves available:

- **Device linearization curve:** the curves that intend to correct the non-linear behavior of the imagesetter, CTP or other device that produce an intermediate media such as film or plate, which can be measured with a densitometer. Commonly these intermediate media are expected to be linear (i.e. 50% measured as 50%).



- **Dot gain compensation curve:** the curve that is intended to compensate for the dot gain on the final media (paper, plastic etc.) and match it to a standard predefined dot gain (e.g. generic offset). Commonly the final result isn't expected to be linear, but rather to match the selected, non-linear dot gain of the ICC profile chosen (i.e. 50% measures 60-70%).

For each type of curve there are 5 curves available, 4 for the process colors and 1 for any other colors. The following actions are possible:

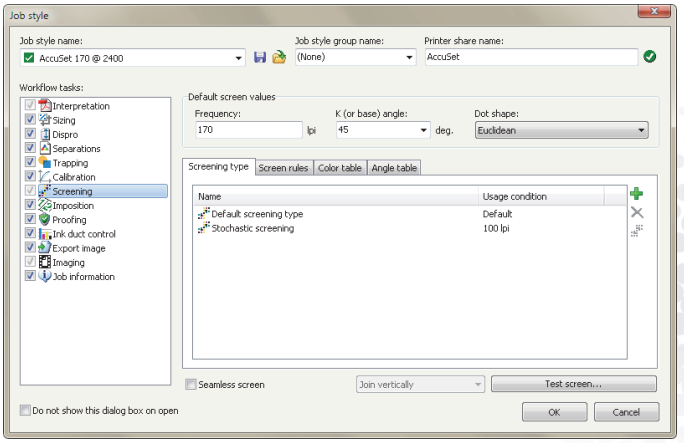
- Click the *Equal curves* button in the right side of the list to specify whether a single curve will be used for all colors, or there will be a separate curve for each of the process colors.
- Click the *Edit curve* button to edit the existing curve or create a new curve for the selected color. See *6.4.4 Calibration curve editor ‹page 64›*.
- Click the arrow in the *Response curve* tab of the list to choose a pre-defined curve from the drop-down list, or to remove the chosen curve.

As the two sets of curves will be inter-linked, they are technically interchangeable (for example, linearization curves can be applied as dot gain compensation curves) – the actual names (linearization and dot gain compensation) are just hints. If any curves, for any purposes, need to be applied to the job, they can be applied in either of the two locations. One thing to understand though, should you want to customize the calibrations, is that the defined curves are response curves rather than transfer curves (one being the inverse function of the other), which is the straightforward solution for linearization (as the curve reflects the actual measured values of the engine at the target printed values), and also the function needed by the rendering module (being applied over the halftone map rather than over the actual incoming colors).

6.2.9 Screening task

The screening task is done for all jobs that are not composite (and naturally turned off if a composite profile is selected). The following options are available:

- **Frequency:** the default screen frequency, in lpi (lines per inch). Can be (and, by default, will be) used by the *Screening type settings* dialog.
- **K (or base) angle:** the default angle, in degrees. It is the base angle for building the angle set. In the case of angles being assigned by color name (e.g. typical color PDF files), this will normally be the angle of the black. Other angles of the angle set will be derived from the base angle, typically the cyan will be –30 degrees from the base angle, and magenta +30 degrees.
- **Dot shape:** the default dot shape. Can be (and, by default, will be) used by the *Screening type settings* dialog.
- **Screening type:** one or more screening types can be defined in a job style: there will be a default screening type, and there may be one or more screening types with a screen frequency value defined as *Usage condition*. If the screen frequency of a given object in the PS/PDF/EPS file matches this value, the matching screening type will be used; otherwise the default screening type will be used. It is possible to assign a special screen frequency to certain objects in the job in most DTP applications, so using this feature it is possible to use different screening



types for certain objects on the page (e.g. a given bitmap printed with stochastic screening, the rest of the page with AM screening). This feature doesn't work in version 3.4.

- The *Add screening type* button will add a new screening type item.
- The *Delete screening type* button will remove the selected screening type item, unless it is the default one.
- The *Screening type settings* button will display the *Screening type settings* dialog. See more in *9.7 Screening type settings ‹page 107›*.

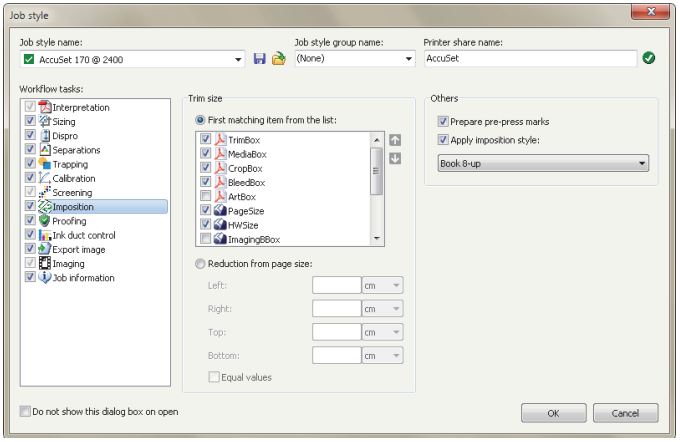
- **Screen rules:**
  - *Override frequency:* the frequency specified in the job will be ignored, using the frequency defined in Cascade instead.
  - *Override dot shape:* the dot shape specified in the job will be ignored, using the dot shape defined in Cascade instead.
  - *Snap angle to multiple of 7.5°:* makes sure that all angles in the job will be a multiple of 7.5° (all common screen sets, including offset, flexo or silk printing, are all using angles that are multiple of 7.5°). For example, old Level 1 PPDs often defined slightly deviated angles to reduce moiré (as the RIPs were unable to achieve accurate screen angles), which obviously are wrong values for modern RIPs and need to be corrected.
  - *Snap to angle set built on K (or base) angle:* makes sure that all angles in the job will be in the screen set suitable for the given technology (e.g. based on 45° for offset, based on 37.5° for flexo, etc.). For example, it can automatically transform the angles of a job with offset angles into flexo angles.
  - *Skin tone protection (place Y angle between C and K):* places the yellow angle (or the angle of any color coming on the standard angle of yellow – 0° in offset terms) between the C and K angles (30° in offset terms). The result will be eliminated M + Y moiré (orange, skin tones), no change for the C + Y moiré, and an increased K + Y moiré (visible only for high black generation).
  - *Yellow moiré reduction:* will reduce the moiré caused by the yellow screen by increasing its frequency by 12%.
  - *Override colors of separations according to the color table:* ignores the colors declared in the PS/PDF/EPS file, and will replace them, in the order they will be shown under the *Separations* item of the job browser, with the items of the *Color table* tab of this dialog. For example, if the color information has been lost for a pre-separated CMYK job, checking this option (and using the default CMYK colors of the *Color table*) will apply (cyclically, if needed) the process colors to the plates of the job.
  - *Override angles of separations using the angle table:* ignores the angles defined in the job, and looks up the angle of the given color in the *Angle table*. It is possible to use color names like *Unidentified color #N*, which will be assigned to the Nth color of the job that didn't have a matching color name.
  - *Guess unspecified separation colors by angle according to angle table:* if the angle of a plate is defined in a pre-separated job, but its name isn't, Cascade will assign a color to the plate by looking up the color of the given angle in the *Angle table*.

- **Color table:** see the *Override colors of separations according to the color table* option above. Colors can be added and removed using the buttons in the right of the table, and the color can be changed by clicking on the color icon or its arrow.
- **Angle table:** assigns angles to color names, used by the *Override angles of separations using the angle table* and *Guess unspecified separation colors by angle according to angle table* options above. Colors can be added and removed using the buttons in the right of the table; the color can be changed by clicking on the color icon or its arrow; the angle can be changed by clicking on the angle text of a selected item, then typing into the editor that appears in about one second (note that two clicks are necessary to edit the angle of an item that is not selected). The angle values will be automatically updated if the *K (or base) angle* field is changed.
- **Seamless screen:** ensures that the left and the right and/or the top and the bottom edges of the job will not produce broken halftones on joining. The most important use of this feature is to produce flexo sleeves that can print continuous, infinite images (e.g. wallpapers), but it can be useful for imposition as well.

Turning on the Seamless screening option will slightly change the size of the job (up to a few millimeters) in the given direction (e.g. the Join vertically option will change the job height). The quality of the yellow screen may also become worse.

- **Test screen:** displays the *Test screen* window, which provides a visual interface for testing the screening system of the job style. The test is made globally for the entire job style, rather than for the selected screening type. See more about its functionality in *9.8 Test screen window ‹page 109›*.

6.2.10 Imposition task



Checking the imposition task is necessary for any of the following:

- to prepare pre-press marks,
- to extract the trim size of the job,
- to apply imposition styles automatically.

The following options are available:

- **Trim size:** defines the trim size (i.e. the final size of the product, without bleed and pre-press marks) of the job. With the imposition task turned on, this will become the displayed and printed size of the job, while the size defined in the *Sizing* task will become the bleed size. See more in *8.6 Bleed ‹page 91›*.

Turning on imposition may change the displayed and printed size of the job, although the processed size remains the same and available as bleed.

- **First matching item from the list:** will extract the trim size of the file from the various size declarations of the PostScript, PDF and EPS files. As their use by the various DTP and pre-press applications isn't very consistent, Cascade allows the user to fine tune the size extraction procedure to get the best possible result with the used applications. Cascade will search for the first definition in the list that is ticked and also present in the PS/PDF/EPS file. The user can change the order of the size definitions, and can check or uncheck them. By default, the *TrimBox* definition is the most desirable one (first in the list and checked), but if it is not present in the file, Cascade will search for the Media*Box*, *CropBox* etc. definitions.
- **Reduction from page size:** the trim size will be computed from the page size defined in the *Sizing* task and reduced by a certain amount. For example, a PostScript file may be generated 5 mm larger than the actual trim size, and then reduced by 5 mm with these controls. The result will be a bleed of 5 mm.
- **Prepare pre-press marks** option will control whether the RIP will process the selected pre-press marks with the job; this will make the ripping process a little longer (up to a few seconds for each job, depending on the complexity and quantity of the selected pre-press marks); however, pre-press marks will only be available for jobs which were processed with this option on. It is recommended that, if using imposition features often, this option is left checked.
- **Apply style** option will apply a pre-defined imposition style (see chapter *8 ‹page 83›*) to the job automatically, and is particularly useful if the same imposition style is used often. It also means that, if, for example, a color catalog with 128 pages is imposed with a collate and cut imposition scheme, with 8 pages on each side of a sheet, the imposition scheme can be (1) defined before processing the catalog, (2) saved as an imposition style and (3) selected here in the *Apply* style list. When processing the job, the imposition style will be applied automatically. The benefit will be, that after the first 16 pages are processed, the first two sheets will be imposed and ready to image immediately, without waiting for the rest of the pages to be processed.

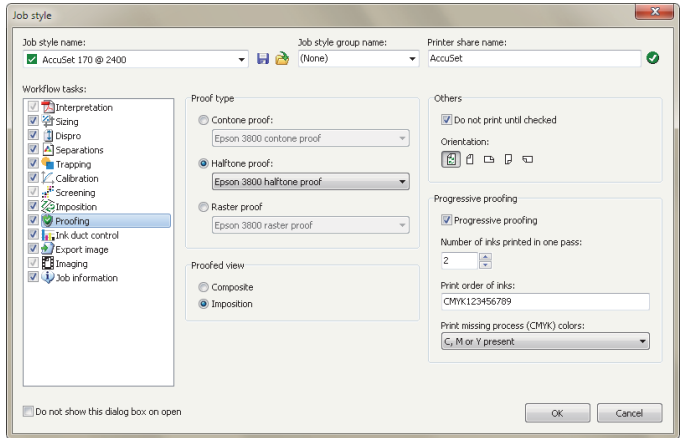
6.2.11 Proofing task

This task needs to be used if the job is processed normally (e.g. for a CTP or imagesetter), but a proof needs to be printed too.

Do not check this profile if the only purpose of the job style is to print a proof, otherwise the proof will be printed twice (as the proof of the proof).

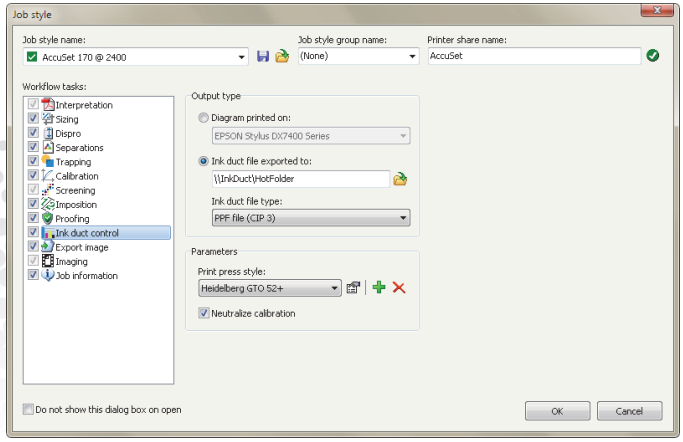
The following controls are available:

- **Proof type:** Raster, halftone and contone proofs can be chosen, assuming that there are proof profiles of the appropriate type defined in the system. Choose the needed proof type and proof profile.



The proofing task will be disabled if there are no available proof profiles in the system.

- **Proofed view:**
  - *Composite:* the composite view of the job will be proofed, as shown in the *Composite* preview window.
  - *Imposition:* the imposition view of the job will be proofed, as shown in the *Imposition* preview window (containing pre-press marks, and eventually several pages per sheet).



- **Do not print until checked:** the proof job will stay in the job browser, waiting for confirmation, until it is checked.
- **Orientation:** the orientation of the proof job, as printed on the proofer.
- **Progressive proofing:** simulates the printing passes progressively. See *5.4.3 Proofing ‹page 40›*.

6.2.12 Ink duct control task

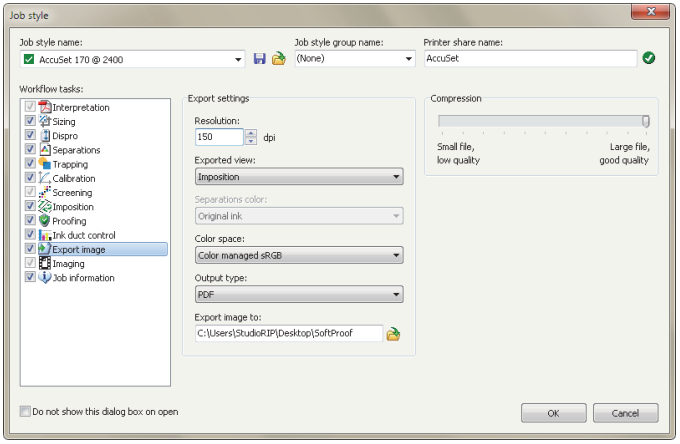
Calculates the ink coverage for each ink zone of the page, belonging to each ink duct of the offset machine, and prints a diagram or exports a PPF or JDF file (that will control the offset press directly).
The following options are available:

- **Output type:**
  - *Diagram printed on:* prints an ink zone diagram on the specified Windows printer (typically a small office printer).
  - *Ink duct file exported to:* exports a PPF or JDF file to the specified folder.
  - *Ink duct file type:* the type of the exported file: PPF (CIP 3) or JDF (CIP 4).
- **Print press style:** the parameters of the print press (cylinder size, number of ink ducts, positioning, etc.). Print press styles can be edited, added or removed with the buttons in the right of the combo box. See *5.4.2 Ink duct control ‹page 39›* for further details about defining a print press style.
- **Neutralize calibration:** neutralizes the effect of the linearization curve, so that the ink duct control information will reflect the real image on the film or plate rather than the calibrated bitmap before exposure.

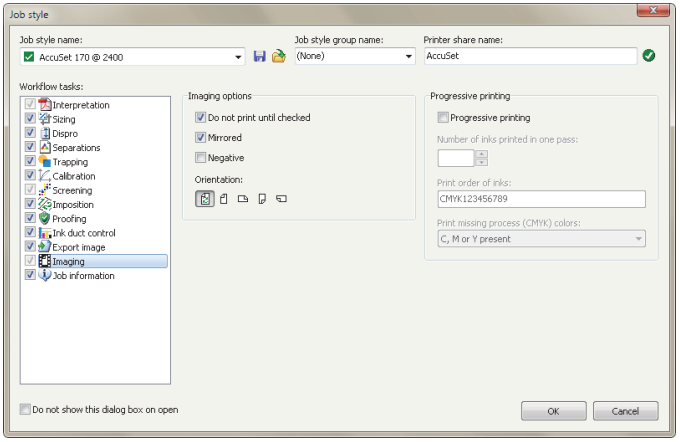
6.2.13 Export image task

Exports the PDF or JPEG preview of the job to a specified folder. The following options are available:

- **Resolution:** the resolution of the generated picture, defaulted to 150 dpi. Higher resolutions are possible, but are not recommended for several reasons (long processing time, large JPEG file and possible moiré problems).
- **Exported view:** specifies whether the composite, separations or imposition view of the job will be exported.



- **Separations color:** available only when separations view is chosen. Controls whether separations will be exported as black or in their original color.
- **Color space:**
  - *Color managed sRGB:* recommended for color or content proofing. The job will be converted into the standardized sRGB color space, which will be dis-played in the same way on calibrated monitors. In this mode the files will be well compressed, suitable for being sent over the Internet.
  - *CMYK or N-color (PDF only):* recommended only if the separations need to be accessed separately. The separations of the job will be stored un-changed, so the displayed colors will depend on the CMYK working space setting of the PDF viewer application. The file size will be significantly bigger in this mode.



- **Output type:** specifies whether a PDF or JPEG (Color managed sRGB only) file will be exported.
- **Compression:** the quality of the JPEG compression, as a compromise between quality and file size.
- **Export image to:** the path the PDF or JPEG files to be exported to.

6.2.14 Imaging task

The imaging task controls the way the job will be exposed or printed on the media. The following options are available:

- **Do not print until checked:** if selected, Cascade will hold the job before sending it out for printing, allowing modification and verification of the job; if the option is not selected, the processed pages will be sent immediately to the Print manager or Tiff catcher;
- **Mirrored:** select if you want to print the job mirrored (i.e. wrong reading), typically for offset printing. If you forget to select this option here, you have several further choices to turn the job into mirrored.
- **Negative:** select if you want to print the job in negative (common in flexography). Though there are further choices for turning jobs into negatives, this is the *only* place to do it if there are calibration curves involved (otherwise the calibration curve will be applied incorrectly).

The mirrored and negative options will show their effect only in media view! This makes previewing the job easier.

- **Orientation:** controls the orientation of the job when placed on the media:
  - *Automatic:* finds the orientation that fits on the media. If the job fits the media in both orientations, chooses the one that is more economical. Note that for single pages it may seem that it chooses the wrong orientation, but the RIP assumes that usually there will be more than one page of the same size to be collected on the width of the media (otherwise registration problems could occur if, when reprinting a color, it has a different orientation than the other plates).
  - *Normal, Left, Right, 180°:* specifies the orientation of the job explicitly.

- **Progressive printing:** designed for proof jobs (i.e. the ones that are either generated by jobs that have the *Proofing* task checked, or opened directly for proofing). Therefore it is the clone of the progressive printing settings in *6.2.11 Proofing task ‹page 59›*, see also *5.4.3 Proofing ‹page 40›* for more information.

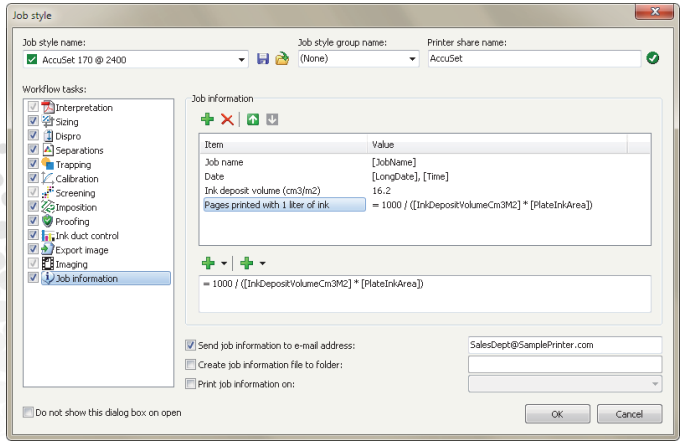
6.2.15 Job information task

The job information settings are designed to carry and collect job specific information such as date, time, customer name, number of pages, ink usage, etc. The collected information can be then saved into a folder, e-mailed or printed for accounting or job management purposes.

The job information is a list of items. Each item in the list has a name (e.g. *Job name*) and a value. The values can be simple texts, but the power of the job information system is that these they can contain fields, such as:

- **Variable fields:** the same list of fields is available as for the pre-press marks (see *8.5.2 Pre-press mark properties ‹page 89›*), including date, time, job name, plate ink area, number of pages, sheets, etc.
- **Cross-references:** references to other items in the list.
- **Formulas:** values starting with the '=' sign will be considered arithmetic expressions that will be evaluated.

Example: let's create a field that will calculate the ink needed for printing 1000 pages.



- First we will define an item called *Ink deposit volume (cm^3/m^2)*, which will specify the ink quantity, in cm^3, needed for 1 m^2 of 100% tint. This is an empirical value, and depends on the ink, paper type and other parameters. Let's consider that the value of this item is 16.2.
- Then we will define another item, called *Pages printed with 1 liter of ink*, its value will be the following formula:

  $round\,(1000\,/\,(\,[InkDepositVolumeCm^3M^2] \times [PlateInkArea]\,/\,10000)$

  The formula contains a reference to the *PlateInkArea* pre-defined variable field, as well as a cross-reference to the *Ink deposit volume (cm^3/m^2)* item (the name is simplified by the insert cross-reference command).

The job information items can be added or removed by the *Add item* and *Remove item* buttons. The order of the items can be changed by the *Move up* and *Move down* buttons. The name of the item can be changed by clicking on it.

The value of the item is displayed in the second column of the list, but also in the box below the item list – this is where it can be edited too. Above this box there are two insert buttons too:

- **Insert field:** inserts a pre-defined variable field, see *8.5.2 Pre-press mark properties ‹page 89›* for the list of available fields (the list is identical to the one available as for the pre-press marks).
- **Insert cross-reference:** inserts a cross-reference to another list item. The drop-down list contains the list of the already existing items.

Typically the items are pre-defined in the job style (job name, number of pages, etc.). There may other items which are defined, but the values need to be filled by the operator when opening the job (customer name, requested quantity, offered price etc.).

The result of the job information task is a text report that contains the item names and the evaluated values. The job information report will group the values into global, sheet, page and plate dependent values (e.g. the ink quantity will be displayed for each plate, but the job name will be displayed only once).

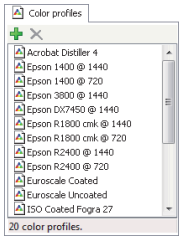
The report can be:

- Sent to the specified e-mail address,
- Saved as text file to the specified folder,
- Printed on the specified Windows printer.

6.3 COLOR PROFILES

The *Color profiles* window manages the ICC/ICM files present in the system. Install a color profile to use for color separation by adding it here. The profiles added are automatically copied to the Cascade folder, with no need to keep the ICM/ICC file in its original location. If the Client is connected through the network or Internet, the file will be safely uploaded (copied) to the server through the TCP channel.

The color profiles can be added and removed by the *Add* and *Remove* buttons in the toolbar of the *Color profiles* window.



6.4 CALIBRATION

6.4.1 Understanding calibration

Calibration allows operators to correct for inaccuracies and variations in the dot percentages that are inevitable in the various pre-press and press processes. Dot gain is a common phenomenon in many of these processes, and calibration can correct for this, as well as any inaccurate dot sizes produced by print engines or any non-linearity in the media. In essence, calibration pre-distorts the dots in the opposite direction by the right amount to compensate for equipment-caused distortions. To achieve this, the printed values are measured with a densitometer, and the results entered into a table. This table will be interpolated by the Cascade, and applied to the dots. The steps of the calibration process are as follows:

- Check whether the density of the engine (i.e. the density of a 100% tint) matches the parameters recommended by the manufacturer (try changing chemicals, adjusting the density, etc.).
- Print an un-calibrated test page.
- Add a new calibration curve, or modify an existing one.

The installed color profiles must be CMYK profiles. Monitor calibration or other profiles will not work, and, if used, may produce unpredictable results.

- Measure the printed calibration page with a densitometer.
- Enter the measured results in the table of the added/modified calibration curve (e.g. 40% measured as 47.5%, etc.).
- Save the calibration curve (assigning a name to it).
- In case of a new calibration curve, let Cascade apply it to the job style it has been made for.
- Optionally, print a calibrated test page to verify for accuracy.

6.4.2 Print calibration page

A test calibration file is included in Cascade ready for immediate printing.

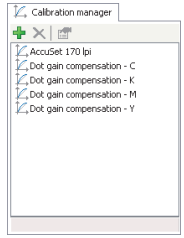
- Select the *Print calibration page* item of the *Calibration* menu. The *Print calibration page* window will appear.
- Select the job style that the calibration will be made for. The job style holds the printer profile and screen settings that influence the calibration curve. The default job style is used implicitly.
- Select whether to print an un-calibrated or calibrated page:
  - The **un-calibrated** page has to be printed before the calibration process. This is the page which will be measured and entered into the table of the calibration curve.
  - The **calibrated** page should be printed after the calibration (and it is also recommended that it is printed regularly), to check whether the calibration has corrected the distortions of the print engine. On the calibrated page the printed and measured values have to match (e.g. the printed 60% has to be measured as approx. 60%).
- Select whether to print a single black page or all four process colors.
- Select whether to print immediately or preview before printing.
- Click print.

6.4.3 Calibration manager

The calibration curves can be added, removed or edited in the *Calibration manager*. Just creating a calibration curve is not enough, it will have to be applied to a specific job style – otherwise it will have no effect. However, the user will be prompted, after finishing defining a calibration curve, to decide

how to apply the new calibration curve; this dialog box is explained below under the section *6.4.6 Applying a calibration*.

To create a new calibration curve, click on the *Add* button in the Calibration manager window. To edit an existing calibration, double click on it within the *Calibration manager* window. The *Calibration curve editor* window will appear.

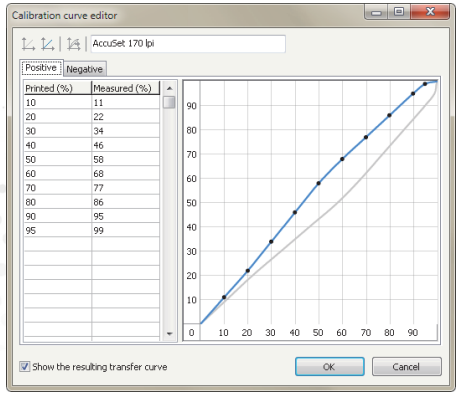

Calibration manager
AccuSet 170 lpi
Dot gain compensation - C
Dot gain compensation - K
Dot gain compensation - M
Dot gain compensation - Y

6.4.4 Calibration curve editor

The calibration curve editor allows the user to build a calibration curve by entering printed and measured values (i.e. desired and actual values) into a table. It is also possible to edit the curve manually by dragging the setpoints on the curve with the mouse.

The entered values can be integer or decimal values, in the range of 0-100. More value pairs will result in a better defined calibration curve, especially at the extremes (close to 0 and 100%). The values entered in the two columns are the printed value (written on the calibration page) and the measured value (read on the densitometer).

The calibration curve above is typical for a capstan imagesetter on a relatively high line screen (170 lpi) and with the density (Dmax) set correctly. As shown, a 50% tint came out as 58% (as measured by the densitometer).



With the calibration curve applied to the dot, when a job has a 50% tint in it, the rip modifies this downwards (printing maybe 42%), forcing the print engine to produce an accurate 50% tint. It does this across the full range of tint values for the dots that it has been applied to.

Printed or measured values of 100% or printed values of 0% will be rejected (the value pair will disappear after entering it). The reason is that they would lead to wrong results, such as 100% tints having halftone dots: if the '98% measured as 100%' value pair is entered in the table, the RIP would – correctly – assume that printing 98% will result in a 100% tint. Indeed, the densitometer would measure the printed 98% tint as 100%, however, most operators would consider this abnormal behavior, and would expect 100% always to be printed as 100%.

On the other hand, this policy will prevent operators from defining such limitations intentionally (e.g. limiting the maximum tint to 90%, common in the gravure industry, or knocking out tints below 2%, common in the flexo industry). These limitations can be defined in the screening type settings, see *9.7.3 Limits tab ‹page 109›*.

6.4.5 Negative calibrations

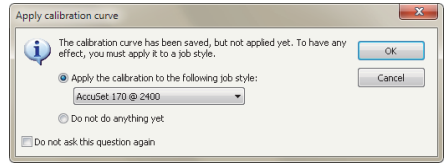
A special case of calibration is to calibrate a system that works with negative output. To calibrate such a system, do the following:

- print a calibration page with the same settings you intend to print your jobs (therefore in negative),
- select the *Negative* tab of the *Calibration curve editor* box,
- enter the values just as you read them (e.g. Printed: 10, measured: 95).

Negative calibrations will be used only if the jobs are processed with the *Negative* option ticked in the job style.

6.4.6 Applying a calibration

Once the calibration curve has been created and saved, it can be applied to one or more job styles. The dialog below will appear automatically as a reminder.


Apply calibration curve
The calibration curve has been saved, but not applied yet. To have any effect, you must apply it to a job style.
OK
Cancel
Apply the calibration to the following job style:
AccuSet 170 @ 2400
Do not do anything yet
Do not ask this question again

The easiest way of applying a calibration to a dot is to let this dialog apply it to the default job style. Calibrations can be also applied manually in the *Job style* dialog.

6.5 DOT GAIN COMPENSATION

6.5.1 Understanding dot gain

Dot gain is a widely misunderstood subject. Pre-press operators are usually surprised to find out that a 50% halftone will become 60-70% on the paper; moreover, it *must* be 60-70% on the paper to produce the expected result.

For historic reasons, today's printing industry has ended up with quite a complicated and difficult way of controlling the dot gain of printing devices:

- The film or plate is linearized with calibration curves; therefore a 50% halftone will be measured as 50% on the film or plate.
- Printing it on the press, a dot gain occurs, and the 50% halftone typically becomes 60-70% on the media.
- The printed result is profiled, and an ICC file will be created that describes the connection between the device independent Lab color space and the CMYK color space of the press.
- When separating a Lab or sRGB color in the DTP application or in the RIP (i.e. converting it to the CMYK color space of the device), the conversion algorithm will take into account the dot gain of the press, as described in the ICC profile. However, the ICC profile contains the dot gain information only indirectly, as CMYK-Lab value pairs, rather than explicit dot gain curves.

The main disadvantage of this method is that the line screen or dot shape settings, the paper type, the print technology or press type have influence on the dot gain, therefore using the same ICC profile might produce very different results. On the other hand, profiling a press is so long and complicated that almost nobody does it; not to mention doing it with all the different paper types, halftone settings etc.

If the printing industry worked on the principle of linearizing not just the imagesetter/CTP, but the output too, using a second set of curves (i.e. having the 50% halftone actually 50% on the paper), life would be much simpler: printers would have better control over the output (checking for the accuracy of the percentages), and the differences between the various ICC profiles would be much smaller (in most cases using the same generic ICC profile would produce satisfactory results after a successful linearization).

Unfortunately the current practice is such that the printing industry doesn't use linearized presses; therefore things are much more complicated. To make matters even worse, CMYK became an industry standard in pre-press (i.e. designers convert everything into CMYK, considering RGB an 'unprofessional' color space), without knowing exactly what CMYK color space are they actually using (but generally using the default offset color space of the DTP applications).

Dot gain compensation is a method that tries to deal with this unfortunate situation: instead of linearizing the output device, it tries to reach the dot gain that is expected by the ICC profile used in the color separation process. In simple terms, it will try to give *exactly* 68% (or whatever the ICC profile expects) on the paper for the 50% halftone screen.

6.5.2 Why use dot gain compensation?

Though the ideal solution would be to have an ICC profile for each paper type, line screen etc., in reality dot gain compensation is the only practical way for most printing houses to correct for dot gain problems.

Dot gain compensation is typically used for correcting the slight dot gain variations of the offset press caused by technological issues like different plate type, higher halftone frequency, older press machine, etc., trying to match a generic (or ISO standard) offset ICC profile used in the pre-press process. However, it may be useful even for printing jobs separated using a generic offset profile on completely different technologies like flexography or silk screen printing – having, at least, the right dot gain is usually a great quality improvement.

If any of the printing parameters are substantially different (e.g. stochastic screening instead of AM), it is almost certain that dot gain compensation will be needed. However, there are so many parameters involved in the printing process that at least checking whether the dot gain is correct or not is definitely recommended.

If the dot gain is substantially different, first search for technological faults (non-linear films or plates, wrong exposure time, wrong ink density on the paper, etc.). If all the possible technological faults are ruled out, dot gain compensation will be needed.

6.5.3 How it works

The dot gain compensation technique uses a second set of calibration curves (like the linearization curves of the imagesetter/CTP, if any) to reach an expected (target) dot gain.

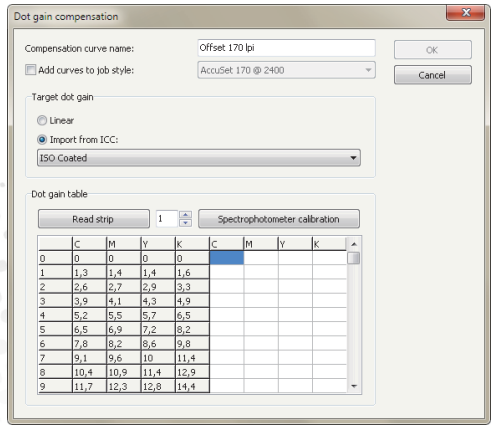
The steps of a dot gain compensation procedure are as follows:

- The target ICC profile is chosen. This is the profile that is used for color separation (typically *ISO coated*). Cascade extracts the dot gain curves from the chosen profile.
- A dot gain compensation chart is printed (e.g. on the offset press).
- The chart is measured with a spectrophotometer. Using the two curves (the desired target dot gain and the actual measured dot gain), Cascade calculates a compensation curve that, applied to the jobs, will match the desired dot gain.
- Cascade saves the computed compensation curves. The curves will be available in the *Calibration manager,* and naturally in the *Dot gain compensation* section of the *Job style* dialog.
- If requested, the curves will be automatically applied to the specified job style.
- The curves can be also added manually to any job style.

6.5.4 Dot gain compensation wizard

The first step of the dot gain compensation procedure is to print the *Dot gain compensation* chart suitable for the installed spectrophotometer, located in the *Proof charts* folder of the installation CD. The file has to be printed with the imagesetter/CTP linearization curve applied (if used), but without any dot gain compensation curves applied.

You will also need a spectrophotometer attached to the Cascade system. See *10.2.1 Spectrophotometer setup ‹page 114›*.



If you have the chart printed and the spectrophotometer installed, open the *Dot gain compensation* window from the *Calibration* menu. The following settings will be available:

- **Compensation curve name:** the name of the calibration curve. Four curves will be created, with the ink name appended to the end of the chosen name.
- **Add curves to job style:** if checked, the created curves will be added to the chosen job style as extra calibration curves.
- **Target dot gain:** specifies how the target dot gain values are initialized in the dot gain table:
  - *Linear:* the output device will be linearized (i.e. no dot gain);
  - *Import from ICC:* the table will be initialized with the dot gain extracted from the chosen ICC file.
- **Dot gain table:** the dot gain table contains nine columns in three groups:
  - **Printed:** the first column, containing the printed values;
  - **Desired:** columns 2-5, containing the desired percentage for each of the CMYK inks;
  - **Measured:** columns 6-9, containing the actual (measured) percentages for each of the CMYK inks.

The four strips of the *Dot gain compensation chart* will have to be read with the spectrophotometer. Then, after reading all four strips successfully, the *OK* button will become active, and the curves can be saved. If the *Add curves to job style* box was checked, the curves will be added to the chosen job style too.

6.5.5 Checking the dot gain

The dot gain of the press can be checked by following the instructions of the *6.5.4 Dot gain compensation wizard* section, with the following differences:

- If you want to check the accuracy of the previously performed dot gain compensation procedure, the dot gain compensation curves must be applied (like the linearization curves, if any) when printing the *Dot gain compensation chart*.
- No compensation curve has to be created. The *Dot gain compensation* window will be used only for displaying the dot gain values.

After the values are all read, compare the *Desired* (1-4) and *Measured* (5-9) columns. Assuming that the technologies being used have good color repeatability (e.g. offset), the differences should not be more than 2-3%. Technologies with worse accuracy (e.g. silk printing) may not be able to achieve better accuracy than 5-8%.

If the values aren't accurate enough for the given technology, try to identify the possible measurement problems, and perform another dot gain compensation procedure rather than creating the curves now.

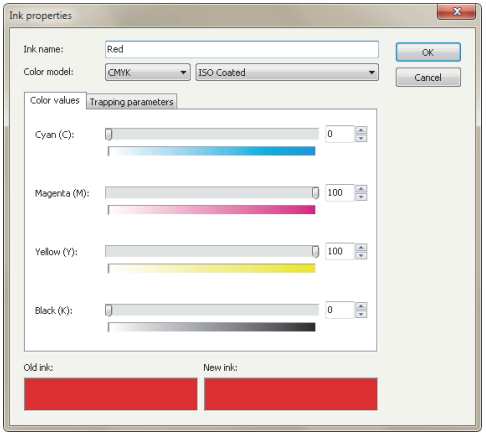
6.6 INK MANAGER

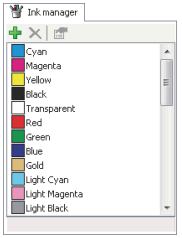
6.6.1 Ink manager window

The inks known by the Cascade system are managed in the *Ink manager* window. These ink definitions are used for:

- on-screen preview of the jobs,
- proofing,
- trapping.

On installation, Cascade's ink list contains only a few inks. When a job is processed by Cascade, it will be checked for ink definitions, and all new ink definitions will be added to the *Ink manager*. Existing inks can be modified or new inks can be added manually using the *Add ink, Remove ink* and *Edit ink* buttons on the toolbar of the *Ink manager*. The *Add ink* and *Edit ink* buttons will display the *Ink properties* window.

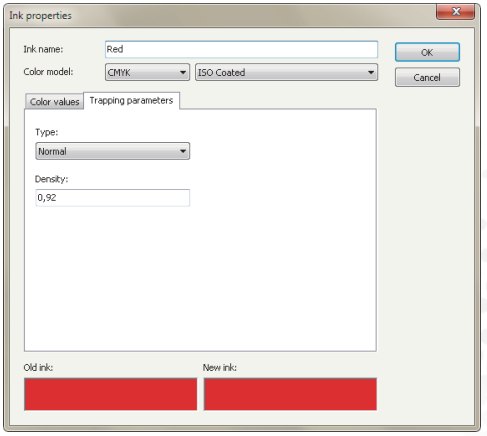




6.6.2 Ink properties window

The ink properties window enables the user to edit the parameters of an ink. The following options are available:

- **Ink name:** the name of the ink, as used in the PostScript or PDF file.
- **Color model:** Except for the cyan, magenta, yellow, black and transparent colors (which have CMYK definitions and cannot be edited), specifies the color model used for the definition of the ink.
  - *Lab:* this is the most desirable way to define spot colors, as it will ensure the most accurate match on proofers.
  - *RGB:* these values are interpreted as sRGB values, so they may be subject for further color management even when displayed on the screen.
  - *CMYK:* these values are device dependent, and will be interpreted according to the ICC profile specified for the current job (in the *Separation profile* field of a job style). The value of the ICC profile box in the right of the *Color model* box will not be stored, and is used for local visualization purposes only.



- **Color values:** the definition of the color in the specified color model.
- **Trapping parameters:** the parameters of the ink used by the trapping module:
  - *type:* specifies the ink type (normal, transparent, opaque, ignored);
  - *neutral density:* specifies the darkness of the ink (so that the lighter tint will always be spread under the darker one).
- **Old and new ink:** the preview of the original and the edited ink.

6.7 USER MANAGEMENT

By default, Cascade is configured for a small office network, letting Cascade clients connect without any password protection. In many cases this will be unsatisfactory. Typical reasons are:

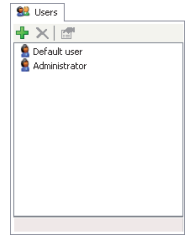
- To prevent unauthorized user access, when Cascade's Server is accessible from the Internet.
- To restrict access to only a select group in the enterprise when Cascade is running within the corporate network.
- To compartmentalize Cascade use, for example, by having a group of users who are only allowed to print jobs, but not permitted to modify the RIP settings.

To overcome these issues, Cascade has built-in user management. This restricts access to the RipServer by the creation of accounts with user names and passwords, and the removal of unprotected accounts, such as the Default user.

6.7.1 Users window

The user accounts are managed in the *Users* window. The accounts listed here can be changed or deleted, and new accounts can be created. At least one account must exist in the system; it is not possible to delete an account if it is the last remaining one on the list. When Cascade installs, there is a user named *Default user,* with a blank password. To add password protection, the blank password will have to be replaced, or new users created and given passwords, not forgetting to delete the default user.

To add a new user, click on the *Add* button in the toolbar of the *Users* window. To edit an existing user's properties, double click on the user name.

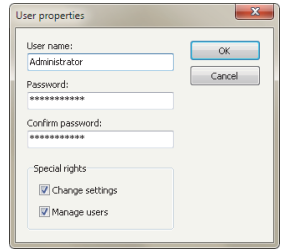


6.7.2 User properties window

When editing an existing user account or creating a new one, the *User properties* window will appear. Specify the login name and password of the user account, as well as the special rights.

Users who can change both settings and manage users are, in effect, Cascade administrators.

Users who can neither change settings nor manage users have full use of the RIP, they can print jobs, make impositions, etc., however they cannot make any changes which could impair its functionality.



6.8 CLIENT OPTIONS

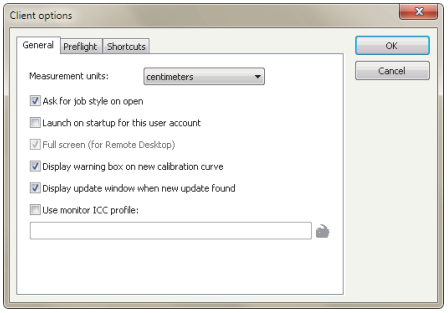
Client options are a set of options stored separately from the global settings of Cascade (see *6.9.1 Server options ‹page 70›*). Specifically, a set is stored for each client, with the client itself; therefore each client can have its own settings. Most of these settings are hidden (i.e. non-user managed, such as the sizes of the dockers), but others can be accessed from the *Client settings* dialog and set manually.

6.8.1 General tab

- **Measurement units:** inch, millimeter, centimeter, point and pixel options; if for some reason the pixel is undefined (there is no device res-

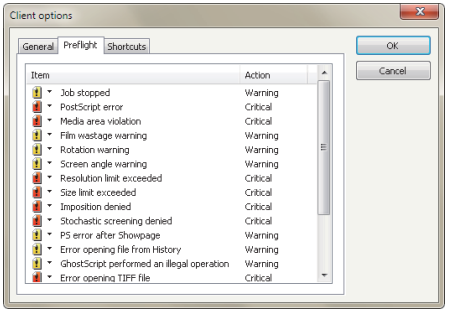
olution to calculate with), a default 1000 dpi is used (so *1000 pixels = 1 inch*).

- **Ask for job style on open:** if this option is checked, the *Job style* dialog will always appear when opening a job with the Client;
- **Launch on startup for this user account:** with this option checked, the client will start at user logon; it is particularly useful with Remote Desktop clients (principally Mac clients), because the Remote Desktop window will automatically start the Client without any user intervention;
- **Full screen:** usually it is used in conjunction with the previous setting. With this option checked, the Client will be launched in full screen mode (i.e. with no title bar, and with the Start menu covered). This is useful with Remote Desktop clients, because:
  - *For PC client:* with Windows Remote Desktop connection, the Remote Desktop window will not contain a second title bar (the title bar of the Remote Desktop application) and a second Start menu (the Start menu of the server), giving the feeling that it is a real Cascade Client window rather than a Remote Desktop window;
  - *Mac:* with full screen Remote Desktop connection it will look and feel more like a real Mac application, with a menu bar at the top, and no Windows Start menu at the bottom.
- **Display warning box on new calibration curve:** with this setting turned on, when defining a new calibration curve, a dialog will appear, to help apply the calibration curve to the appropriate dot.
- **Display update window when new update found:** Cascade checks regularly for updates on the Cascade web site. With this setting turned on, new versions will be reported on the Client.
- **Use monitor ICC profile:** uses an ICC profile for the monitor of the given workstation, linking the *sRGB* color space to the *device RGB* space of the monitor. Note that many monitor calibration software will apply the monitor ICC on system level, in which case applying it again here will lead to wrong result.



6.8.2 Preflight tab

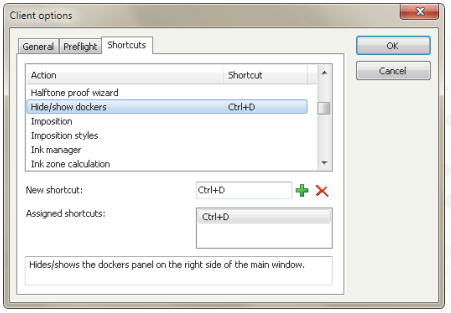
The **Preflight** options let the user customize the severity levels of the preflight warnings. If some warnings are perceived as annoying by the user (for example, the rotation warning appears often, but it only warns about slow rendering), the warnings in question can be set to "Ignore" to stop it appearing. The action of each warning can be set by clicking on the small triangle near the item, and selecting the desired action *(Ignore, Warning, Critical)*.



6.8.3 Shortcuts tab

The shortcuts tab allows the user to customize the keyboard shortcuts. Shortcuts can be assigned to menu items (such as Open), as well as to other special actions such as changing the preview tools or zooming.

To assign a shortcut:



- Select the action in the action list the shortcut has to be assigned to,
- Click in the *New shortcut* box,
- Press the new keyboard shortcut,
- Click the *Add shortcut* button,
- If the shortcut has been used in another action, it will be automatically removed,
- The new shortcut will be added and will appear in the *Assigned shortcuts* box.

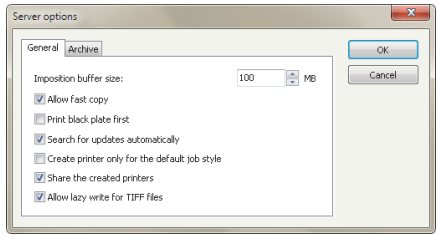
To remove a shortcut:

- Select the action the shortcut has to be removed from,
- Select the shortcut to remove in the *Assigned shortcuts* list,
- Click the *Remove shortcut* button.

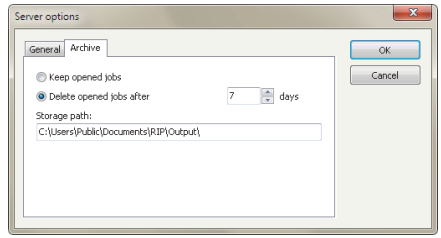
6.9 OTHER SETTINGS

6.9.1 Server options

The *server options* are global settings for Cascade:



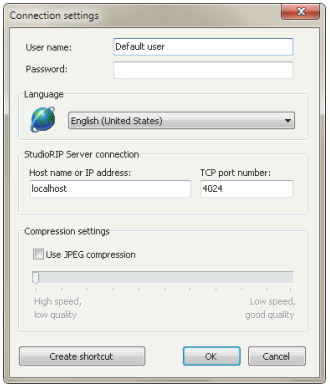
- **Imposition buffer size** affects how quickly a page can be rotated on the final rendering (when it is sent to the Print manager). A value of 100 MB is usually enough for a good speed, larger values may cause problems in the memory management of Cascade.
- **Allow fast copy:** affects the speed of Cascade. If this setting is on, the files will be sent to the Print manager by a single file move operation (which takes milliseconds), if this is possible (that is, no imposition, automatic rotation or other post-rip changes having been made to the page).
- **Print black plate first:** certain systems expect the black separation to be sent first. Checking this option will change the order of separations, always sending the black first.
- **Search for updates automatically:** enables or disables the automatic internet update feature of Cascade. If turned on, Cascade will regularly check for a new version on the Cascade web site, and if available, will propose downloading it and updating the current installation.
- **Create printer only for the default job style:** by default, Cascade creates a shared Windows printer for each defined job style. Operators may prefer to avoid this, especially having a large number of job styles. Turning on this option will create only one Windows printer, for the default job style.
- **Share the created printers:** turning this option off, the created Windows printers will not be shared.
- The **keep/delete opened jobs** options enable or disable archiving the opened (i.e. PS/PDF) jobs in a Cascade folder, for a certain time. By default, jobs are kept for a week.
- **Storage path** specifies the folder where the archived jobs will be stored.
- **Allow lazy write for TIFF files:** when disabled, Cascade writes the TIFF files to the HDD without using the cache system of the operating system (keeping the RAM free). Enabling it may speed up the RIP, but increases the risk of memory problems (even system freezes).



6.9.2 Connection settings

The connection settings dialog can be accessed by the *Connection settings* item in the *Tools* menu, or by clicking *Cancel* after a failed connection attempt. Available settings:

- **User name** and **password:** if there are users added to the Cascade system, you may use one of the defined user names and passwords. Otherwise use 'Default user' as user name, and leave the password box empty.
- **Language:** each Client can run in a different language, as specified here. Note that only certain languages are supported by the Cascade system.
- **Server host name or IP address:** the network address of the computer



running the Cascade Server. This is the setting which usually has to be changed when connecting from a workstation.

- **TCP port number:** the number of the TCP port used by the Client to connect to the Server. If it is changed, it has to be done in sync with the Server. The default value is 4024.
- **Use JPEG compression:** if the Client will be connected over the Internet or over some other slow network connection, it is recommended that JPEG compression be selected to reduce data traffic and thus speed up response. The compression ratio can be adjusted.
- The **Create shortcut** button will save a shortcut to the desktop with the current settings (i.e. visible in the dialog, but not necessarily saved). Several Server applications can be accessed from one PC by creating a shortcut for each Server (this is useful for support engineers or system administrators who are looking after several Cascade systems).

After pressing OK, the settings entered in this box will be stored, and the Client will disconnect and then reconnect automatically with the new settings.

7 Print manager

Print manager is a separate program that outputs the processed pages. It may run on the same computer as the Server, or on a different computer in the network. More than one instance of Print manager can also be used for multiple print engines.

Print manager has its own settings interface, but the Print manager docker of the Cascade Client application provides most of its visual interface. The Client connects to the Server application, and the Server is connected to one or more Print manager applications, some of them on different computers. This is daisy-chained communication, and it is not necessary for the Client to have direct connection to the Print manager(s).

If an error message-box pops up with the text Cascade Print manager: *Cannot load the imagesetter drivers,* when starting Print manager, then the engine drivers are misconfigured and all output will be impossible in this state. See section *7.1.2 Print engine settings* ‹page 74› for details on this, but probably a call to your dealer will be necessary to resolve this problem.

7.1 CONFIGURATION

Print manager can be configured by its *Settings* dialog. This can only be done from the computer that runs Print manager (the Client is not able to access these settings).

Open this dialog by clicking the small film icon of the Print manager in the system tray.

If the Print manager is running as a system service, access to this dialog is not possible. In this case, stop the Print manager service by the Services administration tool, and then start the Print manager as a regular application.

7.1.1 History cleanup settings

The most important configuration settings of the Print manager are the *History management* settings. These settings control how the Print manager deletes old files from the history and, by doing so, keeping the Hard Disk Drive (HDD) from filling up or storing more information than desired.

By ticking the appropriate boxes, the files will be deleted in chronological order when any of the following conditions are met:

- **History folder is greater than** a certain limit (physical size or percent of the HDD). This option will limit the HDD space occupied by the Print manager to within a certain limit, providing space for other programs.
- **Free space is less than** a certain limit on the HDD (physical size or percent of the HDD). This option is useful when Cascade runs on a dedicated computer, and maximizes Cascade's use of available HDD space.
- **File is older than** a certain number of days. For example, if this number is set to 7, files older than a week will be deleted.

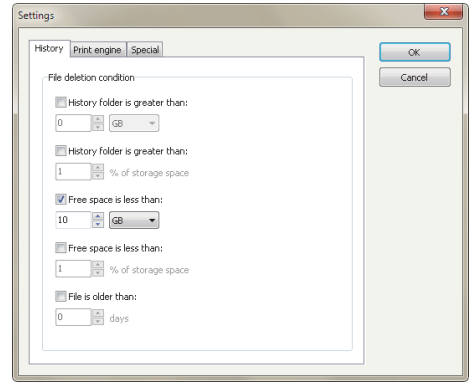
These settings can be combined (for example, if *Free space is less than 10 GB* and *File is older than 365 days* are checked, files will be erased when the free space is under 10 GB, but files older than a year will be deleted anyway).
It is very important to check one of these options, allowing Cascade to keep some HDD space available for efficiency and for system stability. It is recommended that about 10 GB HDD space is kept free (the temporary files of Cascade might need a few gigabytes).

If the History doesn't keep the files (they are grayed out the moment they appear in the list), one of the conditions above is true all the time (e.g. the HDD space is already less than 10 GB), and therefore Cascade tries to keep the needed HDD space by deleting them immediately.

7.1.2 Print engine settings

The *Print engine settings* are normally defined when running the *Add print engine wizard*. However, if using a print engine that is not listed, the settings will have to be entered manually. Other settings, such as the take-up cassette alarm settings, would normally be set manually.

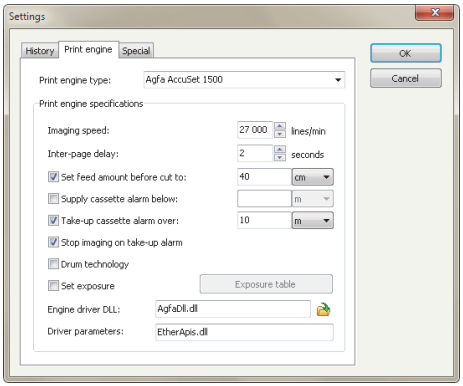
- **Imaging speed** and **inter-page delay** helps the engine to calculate the imaging time; normally the speed of a laser-based print engine is given by the speed of the spinner, which is the same for all the resolutions (so 2400 dpi is twice as slow as 1200 dpi); the inter-page delay is very important on drum machines, where a good part of the time is taken by advancing the media, moving the carriage, or waiting for the on-line processor;
- **Set feed amount before cut:**



  - **Unchecked:** Print manager will send a simple cut command, without specifying the length of the feed to the imagesetter. The settings of the engine or a default value will be used.
  - **Checked:** The feed amount is set by the Print manager, overriding the settings in the engine.

- **Drum technology** option helps the Print manager to display the used media length correctly.
- **Supply** and **take-up cassette alarm** settings will specify when the Cascade Client should show, by blinking the cassette icons in the cassette manager toolbar, that there is too little media in the supply cassette or too much media in the take-up cassette.
- **Stop imaging on take-up alarm:** if this option is checked, the imaging will stop when the amount of media in the take-up cassette reaches the preset level (see above). Until the cassette is cleared, jobs can only be printed one by one, clicking on the *Start* button after each printed page.
- **Set exposure:** if ticked, the rip will set the density of the engine to the exposure value previously set in the exposure table. This will only happen if the resolution/exposure pairing exists in the table.

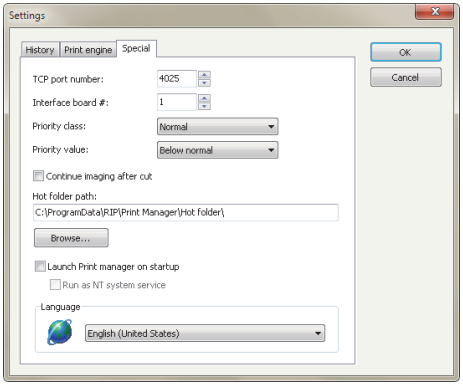
The driver files used for the print engine, interface board and its parameters (typically the communications port) are specified through the **Engine driver DLL** and **Driver parameters fields**. These are engine specific and are normally configured at initial setup. Contact your dealer if there are problems with these.



7.1.3 Special settings

Further settings available in the Special tab of the Settings dialog:

- **Hot folder path:** Specifies the folder for receiving the incoming TIFF files. For installations with multiple hard disk drives or partitions, it may be necessary to change this setting. This is the place where the large amounts of data files are stored. Be sure, when modifying the location of the hot folder, to also change the setting in the printer profiles too. Also, be sure to move the contents of the original hot folder to the new location.
- **TCP port number:** As explained above, this is the port number that the Print manager 'listens' for the Server to connect, the default value is of 4025. For multiple instances of Print manager on the same computer, this port number will be automatically set to a different value by the Setup program.



- **Board index:** if there is more than one board in the system, this index identifies them; the index is allocated by the BIOS of the computer; the boards are numbered from 0; see section *7.2.4 Interface board index ‹page 77›*.
- **Priority class** and **priority value**: Print manager, by default, runs at a very high priority in the system, enabling it to serve the print engines with a continuous flow of data *(Priority class: High, Priority value: Time critical)*. If there are any engine interruptions, a higher value should be chosen. Warning: this may result in the PC running Print manager becoming non-responsive to user actions (effectively, to freeze) whilst outputting to the print engine.
- **Continue imaging after cut:** normally the Print manager enters pause mode after a cut operation, requesting user intervention before continuing working. However, on certain machines this isn't necessary, and imaging can continue after a cut operation. Use this option in such situations.
- **Launch Print manager on startup:** if checked, Print manager will be started automatically on the system startup.
- **Run as NT service:** used in conjunction with the previous setting. If checked, Print manager will be started as a system service, but will not have an icon in the system tray, and will be started before any user logon.
- **Language:** the language of the Print manager application (does not affect the language of the Print manager docker in the Client applications).

7.2 NON-STANDARD SCENARIOS

Possible scenarios for placing *Print manager* relative to the *Server*:

- One Print manager, using the same computer as the Server; this is the fastest and recommended scenario, it is also the default.
- Print manager on a different computer, done for several possible reasons (bigger HDD capacity, logistical reasons etc.);
- Two or more Print managers, some of them on the same computer as the Server, others on other computer(s).

In all of these scenarios, there is one Cascade Server that connects to all the Print managers. The Client application will treat all these Print managers as items in the Print manager list, controlling them directly and easily.

7.2.1 Installing Print manager on another computer

To install a Print manager on a different computer than the one running Cascade Server, run the Setup program on that computer, choose the *Print manager* option in the setup wizard, and follow the steps described in section *2.2.6 Installing Cascade*, then set it up as described in section *3.1.1 Starting Print manager for the first time*.

Once Print manager is set up and running, the Server has to be connected to it. To do this, start the Client. If there is no other print engine defined in the system, the *Add print engine wizard* will be launched automatically by the Client. If a print engine is already defined, launch the wizard manually, from the *File* menu.

Follow the steps described in chapter *3.1.3 Starting the Client for the first time*. The most important thing is to choose the *Different computer* option, specifying the IP address or host name of the computer, which runs the Print manager to be connected to.

The Server will then try to connect to the Print manager. The connection is done through two channels:

- A control channel through a private TCP port, by default 4025.
- A data channel through a shared hot folder.

If the Server and Print manager run on the same computer, these data channels are usually set up without problems. However, when they run on different computers, the procedure is more difficult:

- Make sure that TCP port 4025 is not blocked on the PC running Print manager (either by turning off firewalls and antivirus software, or configuring them to let this port in).
- Share the hot folder of the print manager. By default, the hot folder on an XP computer is in the *C:\Documents and Settings\All Users\Application data\Cascade\Print manager\HotFolder,* on a Vista system it is defaulted to *C:\ProgramData\Cascade\Print manager\HotFolder*. The path can be different if a different data folder has been specified on setup, or there is more than one Print manager on the same PC. Make sure to enable write access too.
- It is recommended that the functionality of the share is verified (i.e. a file can be successfully copied into the shared folder from the Server PC, using Windows Explorer).
- In the first step of the *Add print engine wizard,* set up the network path of the shared hot folder (e.g. *\\WorkstationPM\HotFolder*).

If the connection does not succeed (no control or data link), check whether the IP or host name is correct, whether there is a firewall or other obstacle between the Server and Print manager computers, the hot folder is properly shared and the share name is properly entered in the wizard.

7.2.2 Installing two Print managers on the same PC using the Device manager

To run more than one instance of the Print manager on the same computer, the easiest solution is to run the *Cascade Device Manager application*. For this, launch the application from the Start menu, or right-click the tray icon of a running *Print manager*, then click the *Device manager* menu item.

The Cascade device manager will display the currently installed *Print manager* applications on the PC. You can add, remove, start and stop Print managers using the buttons in the toolbar.

When a new *Print manager* is added, the *Device manager* will automatically assign an index to the newly created *Print manager,* configuring the TCP port of the control channel and the hot folder path accordingly. Then the *Print engine setup wizard* will be started, see *3.1.1 Starting Print manager for the first time ‹page 21›*.

Once Print manager is set up and running, the Server must be connected to it. To do this, start the client, and launch the *Add print engine wizard* manually, from the *File* menu.

Follow the steps described in chapter *3.1.3 Starting the Client for the first time ‹page 23›*, making the following settings:

- *Print manager instance index* has to be set to 2 for the second instance, 3 for the third instance etc. This setting will automatically modify the port number and hot folder path the Server will try to connect to.
- If the Print manager is on a different computer, select the *Different computer* option, specifying the IP or host name of the computer that runs the Print manager to connect to, as well as the name of the shared hot folder (see *7.2.1 Installing Print manager on another computer ‹page 76›*).

The Server will then try to connect to the Print manager. If it does not succeed, check whether the IP or host name is correct, or whether there is a firewall or other obstacle between the Server and Print manager computers.

If it finds a Print manager, other than the one that was expected, check whether the instance index is specified correctly.

When using the same kind of interface boards for the two or more Print

managers, the board index will have to be set up. See chapter *7.2.4 Interface board index ‹page 77›*.

7.2.3 Print manager instance index

One important point to note is that the Print manager instance index (which was specified when running the *Add print engine wizard* in the Client) is the instance index of the Print manager *on the computer where it is installed* rather than globally, in the Cascade system. Here is an example:

- On the computer called Server1, there is a Print Manger installed; the instance index of it will be 1, because it is the first Print manager on this computer; it will listen on port 4025, and its hot folder will be in the *Print manager* folder;
- On the same Sever1 computer, another Print manager is installed; its instance index will be 2, because it is the second Print manager on this computer; it will listen on port 4026, and its hot folder will be in *the Print manager #2* folder;
- On another computer, Server2, a third Print manager is installed; its instance index will be 1 (and not 3), because it is the only Print manager on this computer, it will listen on port 4025 (and not 4027), and its hot folder will be in the *Print manager* folder (and not *Print Manager #3*).

7.2.4 Interface board index

If two Print managers use the same kind of board in the same computer (e.g. two PciAPIS boards are plugged into the same PC), the two Print managers will distinguish the boards using the *board index* parameter: one of the Print managers will use board #0, the other one will use board #1.

Installing a second board later may change the existing board numbering. The newly installed board may be numbered as 0, and the old one has changed to 1. This is because it is the BIOS of the computer that indexes these boards. In this situation change the cables, the boards or the indexes.

Not all boards support instance indexes. Ask your local dealer about whether the boards have support for this feature. If not, the second Print manager will have to be installed on another computer.

EtherSetter interfaces have a slightly different indexing policy, as they are networked and therefore may be visible from more PCs running Print managers.

7.3 ETHERSETTER INTERFACES

EtherSetters are proprietary Cascade interfaces for imagesetters and platesetters. They are small external boxes, connected by Ethernet to the RIP, and by a device specific cable to the print engine, implementing its specific hardware and software protocol (e.g. APIS, Pelbox, LI2/LI5, Speedway).

As they connect through Ethernet, they don't require Windows device drivers. The only practical problem connecting them is to create the TCP/IP link between the Print manager and the EtherSetter box. Usually the link is created automatically, without a setup procedure: the installation is smooth and easy in almost any network configuration. However, in special situations (multiple EtherSetters per network, EtherSetter and Print Manager in different LAN segments etc.), the information below might be useful. For further details see *2.2.2 Installing an EtherSetter box ‹page 15›*.

7.3.1 Multiple EtherSetters per network

In case of multiple EtherSetter boxes per network, each Print Manager will choose its own EtherSetter box according to the *Interface board #* setting in the *Special* tab of the *Settings* dialog of the *Print Manager* application. The numbering of the boxes is done in the increasing order of their unique IDs (board #1 in the system having the smallest ID, board #2 having the next ID etc.).

If a new box is introduced into the system, it will not necessarily have a higher index (as board index is determined by the unique ID of the boxes rather then by the order of appearance in the network).

When new box(es) are introduced into the system, boot up the Print Managers one by one; if the Print Manager doesn't connect to the right box, change the interface board # and try again, until it connects to the right box.

It is very important to have all boxes running when the Print Managers boot up. If box #1 is switched off during the boot-up procedure, box #2 will become box #1.

7.3.2 Default IP assignment

By default (as well as after a reset operation initiated by pushing the reset button on the box) the EtherSetter boxes are configured to automatic IP configuration through DHCP. Normally they will get an IP just as any other

computer in the LAN would, avoiding possible IP conflicts, and no further intervention will be needed (either from the user or from the Print Manager).

If the DHCP request fails, the automatically assigned IP will be 192.168.0.124. If this IP is outside of the subnet of the Print Manager PC, the Print Manager will choose an IP that is in the right subnet (e.g. if Print Manager has an IP of 192.168.3.23, then the chosen IP will be 192.168.3.124). If there are more EtherSetter boxes in the system, the last number of the IP will be increased (e.g. the second board will have an IP of 192.168.3.125 in the previous example), until a free IP number is found.

7.3.3 Static IP assignment

Static IP assignment may be needed when:

- the network administrator wants to control the IP of the box,
- the EtherSetter box and the Print Manager are in different LAN segments, and auto-setup broadcast packages are not propagated between them.

To configure the IP settings of an EtherSetter box, its HTTP service has to be accessed. For this, the IP address of the box needs to be known:

- if there is a DHCP server in the system, find out the assigned IP from the DHCP log or lease table;
- if there is no DCHP server in the system, the automatically assigned IP will be 192.168.0.124;
- if the IP of the box is outside of the subnet, modify temporarily the IP address of the PC to match the subnet of the box.

Typically you will have to access the http://192.168.0.124 page. Modify the settings, save them and then restart the box.

Fill in all the fields correctly, not just the IP. The Linux system of the boards will detect faulty settings (e.g. the gateway being in a different subnet than the IP), and will not work correctly.

To keep the assigned IP, change the EtherSetter.ini file too, see the chapter below.

7.3.4 EtherSetter configuration file

There is a configuration file in the Cascade program folder (typically C:\Program files\Cascade\EtherSetter.ini). Normally this file doesn't need to be changed; however, for static IP configuration it will be necessary. The file contains records like:

```
[Board #1]
IP = auto
Port = 4023
```

Leaving the IP setting on *auto* will allow the Print Manager to negotiate an IP address with the box (keeping the DHCP-assigned IP or, on DHCP failure, assigning one).

When static IP assignment is wanted, the static IP needs to be entered into the configuration file instead of *auto*. This will instruct the Print Manager not to send broadcast messages at all, but rather to try to connect to the given IP directly.

The board number in brackets refers to the *Interface board #* field of the Print manager (see *7.3.1 Multiple EtherSetters per network ‹page 77›*). In case of one board per network, only the first record will have to be changed.

7.3.5 Establishing connection, step by step

In case of problems, a deeper understanding of how the Print manager establishes connection with the EtherSetter box may be necessary. Here is the step by step procedure:

- The Print manager reads the record specified by its Interface board # setting from the configuration file (see *7.3.4 EtherSetter configuration file ‹page 78›*). If a static IP is specified, it will try to connect directly. If auto is specified, it will follow the procedure below.
- It will broadcast an identification request. All the EtherSetter boxes in the network will reply with their current settings.
- It will choose the right box based on the Interface board # setting (see *7.3.1 Multiple EtherSetters per network ‹page 77›*), and will start to negotiate a suitable IP for it.
- If the IP of the box is in the right subnet, and isn't in conflict with other EtherSetter IPs in the subnet, it will connect to it.
- If the IP is not suitable, it will initiate another DHCP request (assuming that the cable was plugged in later).
- If the IP is still not suitable, Print Manager will assign an IP address, calculated from the IP of the PC, the last number being 124 (or, in case of multiple EtherSetters per network, 125 or more).

As Epson printers allow Cascade a low level control of the printing process (droplet size, paper feed, head movement), operators can fine tune the available Epson printing parameters for their specific needs.

7.4.1 The Epson parameters

The Epson printer parameters can be configured in the *Print engine properties* dialog of Epson printer (accessible through the *Print engine properties* button in the toolbar of the *Print manager* docker). The following options are available (note that choosing *Default* for the options below means that the settings recommended by the Cascade configuration files will be applied):

- **Quality:** suppresses the banding of the printer at the expense of printing speed, *10.4.2 Banding ‹page 124›*. It is recommended that the highest speed is chosen, consistent with offering a pleasant, banding free output.
- **Bidirectional mode:** specifies whether the print head prints in both directions (achieving almost double speed). It is recommended that it is turned off for top quality output (especially if halftones are printed), but in many cases (typically for contone proofs) the double speed is more important than the often barely visible quality loss.
- **Borderless printing:** prints the image on the media without leaving the default border of a few millimeters. Some printer models may not support it, or support it only partially (e.g. only horizontally).
- **Paper thickness:** adjusts the distance of the print head from the paper. Some printer models may not support it.
- **Drying time per scan:** the time, in seconds, that the printer waits between two head scans so that the ink can dry.
- **Drying time per page:** the time, in seconds, that the printer waits between two jobs so that the ink can dry.
- **Density:** the density of the ink, the valid range is 0-300 (using density values of 100, 200 or 300 will instruct the printer to use the small, medium or big droplet sizes, while other values will be achieved by the stochastic combinations of two droplet sizes).
- **Outline protection:** allows the operator to specify a special density value for the outlines (including the edges of halftone dots), to avoid excessive dot gain. *7.4.2 Printing on inkjet film ‹page 79›*. The width of the protected outline can be specified in device pixels (e.g. on 1440 dpi one pixel will mean 1/1440 inches),
- **Density of the protected outline:** works in conjunction with the *Outline protection* parameter, allowing the operator to specify a special density value for the outlines.
- **Halve resolution:** allows the user to halve the horizontal or vertical resolution. For example, a 1440 × 1440 dpi job can be printed on 1440×720 or 720 × 1440 dpi (the Print Manager will resample the job while printing without a major quality loss), achieving double printing speed. Note that the density may need to be adjusted after changing this setting, as the quantity of printed ink will also be halved.
- **Ink(s) used for separation:** allows the operator to print separations using a different ink (e.g. cyan instead of black), or using a combination of two inks (e.g. yellow + black together).
- **MicroWeaving:** Cascade has a built-in microweaving system (see *10.4.2 Banding ‹page 124›*) which usually provides a smooth, banding free output. However, on certain professional Epson printers the built-in microweaving system might offer a higher quality output. This setting allows the operator to choose the built-in microweaving system of the printer. Note that certain resolutions might not be supported by the printer in printer based microweaving mode, and most desktop models don't support printer based microweaving at all.

7.4.2 Printing on inkjet film

For most technologies, inkjet films need to have high density. To achieve the required density, much higher quantities of ink need to be printed on the film than on the paper. However, large quantity of ink will increase dot gain, and will distort the shape of the screen dots.

The first picture shows a halftone dot printed with small droplets, having small dot gain, but also low density; the second picture shows a halftone dot printed with big droplets, having adequate density but also high dot gain.

Cascade's Epson driver can control the ink density at droplet level through the VSD (Variable Droplet Size) feature of Epson printers, allowing the user the choice of where to print bigger or smaller dots, so the driver can be fine tuned for the various media types. Typically a one pixel thin outline at the

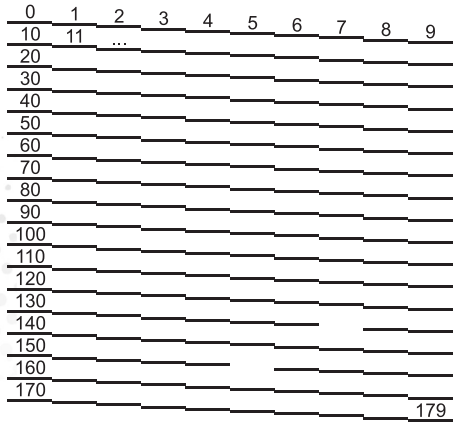
edges needs to be printed with a smaller droplet than the inner pixels, but other settings are also possible. The last picture shows a halftone dot printed with big droplets for the inner pixels but small droplets at the edges, with sufficient density and low dot gain at the same time.

The recommended procedure to set up inkjet film printing is as follows:

- Print the calibration chart of the Cascade and measure the solid 100% areas with a densitometer.
- Adjust the *Density* value of the printer (typically a value between 200-300, see *7.4.1 The Epson parameters ‹page 79›*) to achieve the desired density (Dmax) on the film.
- Turn on *Outline protection;* start with a 1 pixel outline and the *Density of the protected outline* value set to 100.
- Check the halftone quality with an eye loupe. If the dot gain is too high, increase the *Outline protection* value to 2-3 pixels.
- If the dot gain is low, increasing the *Density of the protected outline* value may improve the quality of the halftone dots.
- When the density and dots are satisfactory print the calibration chart again and calibrate the printer.

7.4.3 Registering dead nozzles

There are situations when one or more nozzles of the printer are permanently blocked, software or hardware head cleaning operations failing to cure the problem. A blocked nozzle (even if it's blocked only partially, not placing the droplet in the right way) can seriously damage the quality of the output.



Cascade allows for this possibility by registering one or more nozzles as dead and then not using them at all for printing. As the microweaving system uses multiple nozzles for one scanline anyway, this will be done without any speed or quality loss. Note that this feature is not supported if the *MicroWeaving* parameter is set to *Printer based*.

The procedure for registering dead nozzles is as follows:

- Print a nozzle test page, and search for the dead nozzle(s).
- Write down the ink (e.g. Light cyan) and number of the nozzle. For example, on the picture above nozzles #137 and #155 are dead.
- Open the *DeviceSettings.ini* file in the Print manager data folder in Notepad.
- Create a section called *DeadNozzles* (see example below) at the end of the file.
- Create a line with the name of the ink (C, M, Y, K, LC, LM, LK or LLK) followed by the '=' sign and the numbers of the dead nozzles separated by commas (each comma followed by a space).
- Save the file and restart *Print manager*.

In the example above, the newly added section will look like this:

```
[DeadNozzles]
LC = 137, 155
```

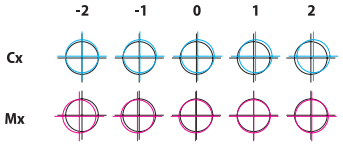
7.4.4 Head alignment

Epson printers may have head misregistration problems (i.e. different inks printed in slightly different position), causing blurry edges. Cascade can be set up to compensate for this registration error by sending the various separation planes pre-shifted in the opposite direction to the registration error, so that the result will be a perfect registration.

To align the heads of an Epson printer, follow the steps below:

- Print the *Inkjet head alignment.pdf* file from the *Proof charts* folder of the installation CD using a native (i.e. not proof) Epson printer profile. If the printer does not have some of the light inks, you may delete them by selecting the unnecessary plates in the *Job browser* and clicking the *Delete* button.
- Search for the best registration in each row. Note that there is a row for horizontal (X) and another one for vertical (Y) registration; look for the best registration match only on the given axis (e.g. in the *LCx* row look

for the best *horizontal* registration), ignoring the eventual misregistration on the other axis.



- In the example above, the best cyan registration is in the –2 column (vertical misregistration ignored), and the best magenta registration is in the +1 column.
- Open the *DeviceSettings.ini* file in the Print manager data folder in Notepad.
- Create a section called *HeadAlignment* (see example below) to the end of the file.
- Create a line for each row with misalignment. For example, in the example above the Cx line needs a correction of –2, so enter the name of the line (Cx) followed by the '=' sign and the correction value (–2). Null corrections can be ignored (i.e. their lines can be omitted); very small correction values may also be ignored.
- Save the file and restart *Print manager*.

In the example above, the newly added section will look like:

```
[HeadAlignment]
Cx = -2
Mx = 1
```

8 Imposition

Cascade has a built-in imposition system, which is able to work with pre-press marks, and is able to perform complex impositions (saddle stitching, collate and cut etc.).

Cascade has a post-RIP imposition system, which means that the pages are first processed, and the imposition is performed on the processed pages. This has several advantages:

- 100% certainty that a page will not be changed during the imposition (whilst with PostScript based imposition software there is no certainty that problems will not occur, due to the complexity of PostScript);
- Pages that are step and repeated over a sheet will be processed only once;
- Verifying the job during the imposition is possible, right down to pixel level, with no need to process the job again and again to check if, for example, there is a white hairline between two pages;
- Completely different jobs, with different screen settings, can be combined on the same sheet.

The only disadvantage to this approach is when jobs that have halftones right to the edge of the page (for example, a page with a 20% gray background) meet. These may have broken halftones on the touching edges of the pages. This presents problems if there will be a single cut between the pages. The only practical solution in these cases is to use two cuts between the pages.

8.1 UNDERSTANDING IMPOSITION

8.1.1 Separation, composite and imposition pages

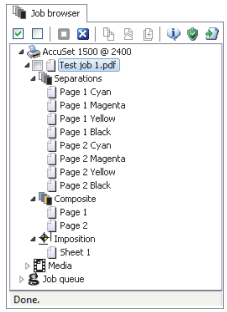
Cascade builds the final print in three steps:

- the separations are grouped into composite pages,
- the composite pages are arranged in imposition sheets, and
- the imposition sheets are then separated again (if needed), and placed onto the media.

The picture below shows how the 8 separation pages are grouped into 2 composite pages, and the composite pages are imposed on one sheet.

Cascade imposition works with the composite pages of the job, the ones

shown under the *Composite* node of the job browser tree. The results of the imposition are the sheets, shown under the *Imposition* node.



An imposition can only be made up from pages of the same job. To create an imposition using pages from different jobs, first combine the jobs.

8.1.2 Splitting jobs for imposition

If different imposition styles will be used on different pages of a job, first split the job (resulting in two jobs), then each of them can be imposed in its own style.

Here is an example: the color pages of a book will be printed on an A3 machine, the black and white pages will be printed on an A2 machine. Therefore, the black and white pages will have a different imposition scheme from the color pages. Select the color pages of the job (under the *Composite* node) and click the *Split job* button. The selected pages will be extracted from the job, and a new job will be created, containing these pages. The new jobs can now be imposed separately.

Use drag & drop to move pages from one job to another (this works only for separation or composite pages).

8.1.3 Combining jobs for imposition

To impose the pages of different jobs into one imposition, first combine them, resulting in one job containing the combined pages from the two jobs. Then impose them.

Here is an example: Two A3 designs from different companies, in different files. It would be more economical to print them together on an A2 sheet. Open and process all of the files, select the job items in the *Job browser* window, then click the *Combine jobs* button in the toolbar. The imposition can then be made using the combined pages.

8.1.4 The imposition sheet

The imposition sheets are shown under the *Imposition* node of the job tree in the *Job browser*, each imposition sheet having its corresponding node.

An imposition sheet has a user-definable size, and contains one or more composite pages and pre-press marks. There are controls for the position and orientation of each composite page on each imposition sheet.

When a job opens, it automatically generates one sheet for each composite page. Initially there is no difference between the composite pages and the imposition sheets, they are equal in number, each imposition sheet containing only the corresponding composite page, having the same size and content as the corresponding composite page.

When making an imposition, the number, sizes and content of the sheets is changed. This can be done in two ways:

- Using the imposition window, which automatically performs the imposition for the standard imposition schemes, or
- Using the controls on the toolbar, which gives manual control of the positions of the pages.

8.2 IMPOSITION STYLES

Using the automatic imposition is the easiest way to create impositions. The automatic imposition settings can be saved for later use, and can even be applied on-the-fly, in processing time, for books or catalogs.

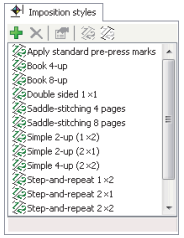
The imposition window manages the Imposition styles. Using this window, impositions can be added, removed or edited. By using the *Apply imposition* button, the imposition can be applied to a selected job. The *Clear Imposition* button will remove any imposition from the current job.

8.3 IMPOSITION PROPERTIES

When adding or editing an imposition, the *Imposition properties* window will appear. A slightly modified version of this window will appear too when clicking on the *Imposition* button on the main toolbar, or choosing the *Imposition* menu item.

With this window opened, either apply the imposition settings on the selected job using the *Apply* button, or save the settings as an imposition style (*Save* or *OK*, depending on which way the window was opened).

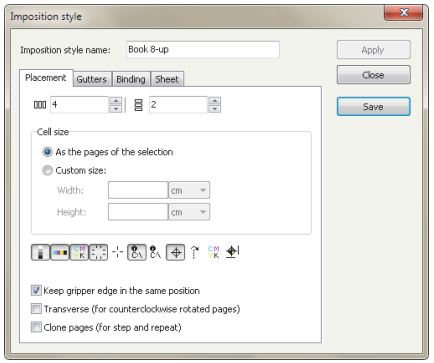
Pushing the *Apply* button, the RIP will automatically resize the sheets to



fit the contents, and will apply the imposition to all the sheets of the current job.

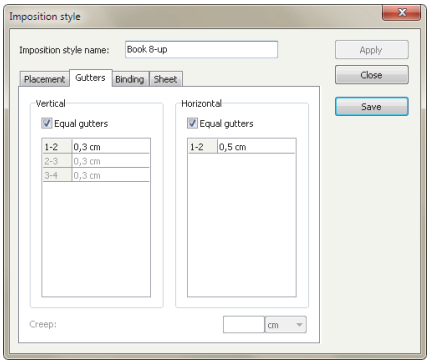
If Cascade detects that the imposition scheme is wrong, the *Apply* button will be disabled, and an error message will appear under the window, explaining why the RIP considers that the settings are invalid.

8.3.1 Placement tab



In the placement tab, the following options are available:

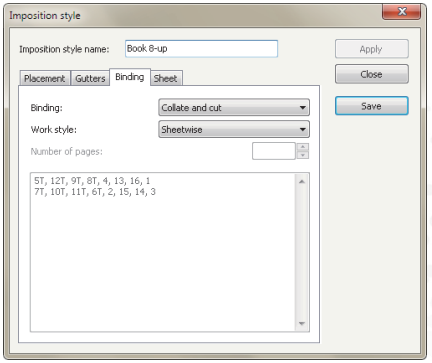
- **Number of rows and columns:** the exact number of rows and columns that will appear on the sheet, taking into account the pages doubled by the work-and-turn and work-and-tumble styles. Example: For a double-sided A4 job, which will be printed with work-and-tumble, a 1×2 page must be specified instead of 1×1.
- **Cell size:** some technologies use fixed cell sizes for impositions (for example, labels with fixed sizes). By specifying the cell size, the pages will be centered into these cells, irrespective of their size.
- **Pre-press marks:** available only if the *Prepare pre-press marks* option is checked in the job style.
- **Keep gripper edge in the same position:** it is particularly important on CTP machines, where the gripper edge must fall in the same position on the plate. The effect of this setting will be that on double sided impositions the pages (but not the pre-press marks) of the second signature will be rotated by 180°, which in practice means that the gripper edge will be always in the same position.



- **Transverse:** if the media saving has rotated the pages (normally done counterclockwise), ticking this option will also rotate imposition to match the orientation of the pages. Normally imposition works on upright pages only, so leaving this option un-ticked will result in incorrect imposition for rotated pages.
- **Clone pages:** Multiple copies of the same page (step and repeat).

8.3.2 Gutters tab

In the gutters tab, specify the horizontal and vertical gutters of an imposition. If the *Equal gutters* box is ticked, only the first gutter will be editable, and will be applied for all the gutters.

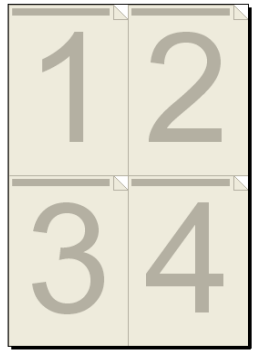


The **creep** option is useful for saddle stitching (for other binding types it will be grayed out): the more pages there are in a saddle stitched publication, the more that the inner pages move out from the binding edge compared to the outer pages (the phenomenon is known as *creep*). To compensate for the creep, the gutter is progressively increased on the pages working from the inside of the book to the outside, by the amount specified in the creep option.

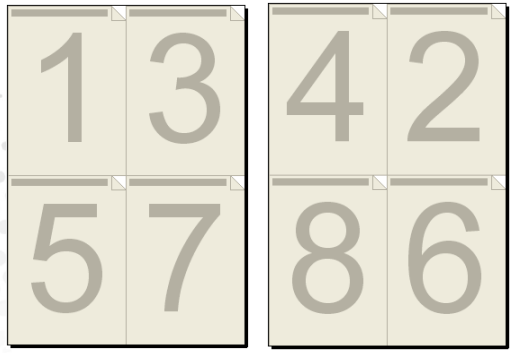
8.3.3 Binding tab

In the *binding* box there are the following options:

- **Perfect binding:** the output is intended to be cut and collected; on single-sided works, this means that the pages are numbered simply in their natural order. On sheetwise (double-sided) works, the even and odd pages are on different sides of the sheet, and the back is numbered from right to left to match the front.



Perfect binding, single-sided



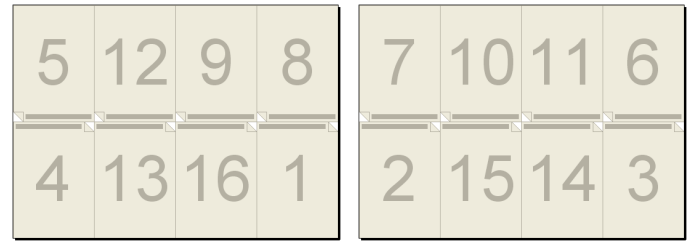
Perfect binding. Single-sided *(left)*, sheetwise *(right)*

- **Saddle stitching:** it is used for publications with few pages (usually not more than 32); the pages are collected, stitched on the saddle, and then folded on the saddle; typically it is used only for 2×1 and exclusively for sheetwise schemes;

8-page saddle stitching. First sheet front *(top left)* and back *(bottom left)*, respectively second sheet front *(top right)* and back *(bottom right)*

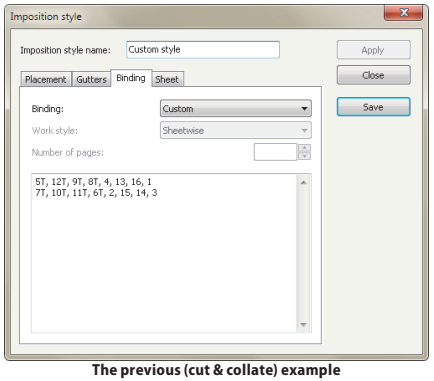
When using saddle stitching, the number of pages must be specified for the scheme to be applied.

- **Collate and cut:** is the typical imposition scheme for books; the sheet, containing 2, 4, 8 or more pages on each side, is folded consecutively on the horizontal and vertical axis until the size of one page is reached, then it is cut on the sides, except on the saddle where it is bound. It too is an exclusively sheetwise scheme.



16-page collate & cut. Front *(left)*, back *(right)*.

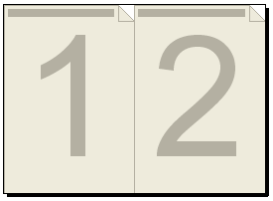
- **Custom:** To create more complicated imposition schemes, use the *custom* option, which enables the page list for editing. Each row in the list represents a signature. The pages are numbered from left to right and from top to the bottom, the page numbers are separated with commas; a *T* after a page means a 180° rotation, *R* means a clockwise rotation, *L* means a counter clockwise rotation; a # sign before the number means absolute page number, while the normal numbers are relative to the beginning of each signature cycle, and can be repeated to the infinite.



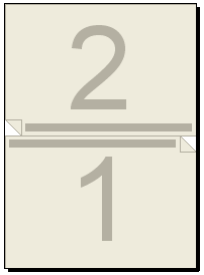
The previous (cut & collate) example written as a custom style

The work style describes the way the sheet is feed back into the print machine (if it is). There are the following options:

- **Single-sided:** the sheet goes through the print machine once, it is printed only on one side.
- **Sheetwise:** the sheet is double-sided, and has a front page on one side, and a back page on the other side.
- **Work and turn** and **work and tumble:** an old and well-used trick to save time. Instead of printing the front of the page, then changing the plates on the printing machine and printing the reverse page, a sheet of double size is used, each side of it containing both the front and the back. The same thing is printed on both sides of the sheet, but so arranged that each front page has the back page on the reverse side. The work-and-turn and work-and-tumble styles can be combined with binding styles: for example, a saddle-stitched job (2×1) can be printed as work-and-tumble, transforming it into a 2×2 job.



Work and turn, used for portrait pages



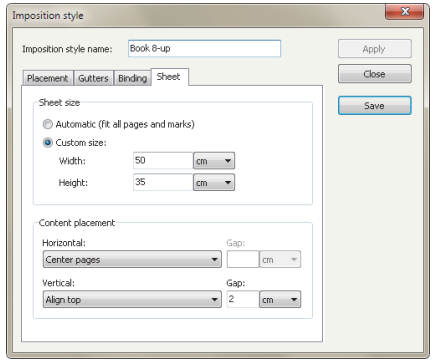
Work and tumble, used for landscape pages

8.3.4 Sheet tab

The Sheet tab controls the final size of the imposition sheet, as well as the positioning of its contents. The following options are available:

- **Automatic (fit all pages and marks):** will set the size of the sheet automatically to fit all pages and marks.
- **Custom size:** enables the operator to set the size of the sheet manually with exact width and height values.
- **Content placement:** specifies the placement of the content of the sheet with the following options:
  - **Center pages and marks:** centers the content of the sheet horizontally/vertically taking in account the marks too, if any (in other words, centering the bounding box of the entire image, including marks);
  - **Center pages:** centers the content of the sheet horizontally/vertically ignoring the marks (in other words, centering the bounding box of the pages, without the marks);
  - **Align left/right/top/bottom:** aligns the content of the sheet horizontally/vertically to the left/right/top/bottom of the sheet, ignoring the marks (based on the bounding box of the pages).

- **Horizontal/vertical gap:** specifies the alignment gap (i.e. the distance between the bounding box of the pages and the specified edge of the sheet). For example, left alignment with 1 cm gap will place the left-most page at 1 cm from the left edge of the sheet.



8.4 MANUAL IMPOSITION

To make an imposition with unusual page positioning, with pages of different size, or to position pages manually, or on an exact location, use the manual imposition tools. The changes are applied to the selected sheets. If there is no sheet selected (which happens by default), the changes will be applied to all the sheets in the job.

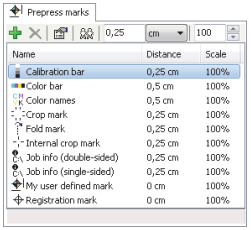
If the selected sheets are not the same, the controls will be disabled.
Controls available are:

- **Sheet width** and **sheet height**: the size of the sheet;
- **Physical pages on sheet:** the number of pages which will be physically printed on the page; for example, if one page is repeated 4 times on the sheet, this has to be set to 4;
- **Add page** button: will add a page to the sheet, that can then be changed or moved;
- **Remove selected pages** button: will remove the selected pages, including pre-press marks;
- **Select all pages** button: will select all the pages on the sheet, including pre-press marks; useful for moving the whole contents of the sheet by drag & drop;
- **Logical pages on sheet:** each sheet has 'linked' a certain number of logical pages (composite pages, under the *Composite* node); typically this is equal to the number of physical pages (for common book impositions), or is equal to 1 (for step and repeat); however, it may be necessary to use custom values: for example, each sheet will contain 4 pages, *Sheet 1* containing *Page 1, Page 1, Page 2, Page 2,* and *Sheet 2* containing *Page 3, Page 3, Page 4, Page 4;* in this situation, the number of logical pages per sheet is 2, while the number of physical pages is 4;
- **Sheet cycle:** is number of signatures (the number of sheets with different imposition scheme); this is typically one (for singe-sided work) or two (for sheetwise work), but there are special cases when other values are used; for example, if the collate and cut technique uses two sheets instead of one (after the sheets are folded, one is placed into the other, like for saddle-stitching), then it will have four signatures;
- **Signature buttons:** a button will appear for each signature; by pushing the button, it will select all the sheets belonging to that signature; for example, with two signatures, pushing the button of the second signature will select the even sheets of that job;
- **Page placement:** the horizontal and vertical positions of the selected page(s) on the sheet, relative to the top left-hand corner of the sheet;
- **Page number:** the number of the selected page(s); this number can be absolute (linking directly to the composite page of the specified number) or relative (this is used for repetitive schemes); the relative page numbering is always relative to the first page of one sheet cycle;
- **Page orientation**, **mirror** and **negative** buttons**:** applied to the selected page(s);
- **Pre-press marks:** by pushing these buttons, the pre-press marks of the specified type will be removed, and then added again; releasing the button the marks will just be removed; note that when moving the pages later, the marks will not follow the pages, they will have to be removed and added again.

8.5 PRE-PRESS MARKS

Cascade comes with the most common pre-press marks, but other marks can be defined, or the existing ones can be changed.

8.5.1 Pre-press marks manager



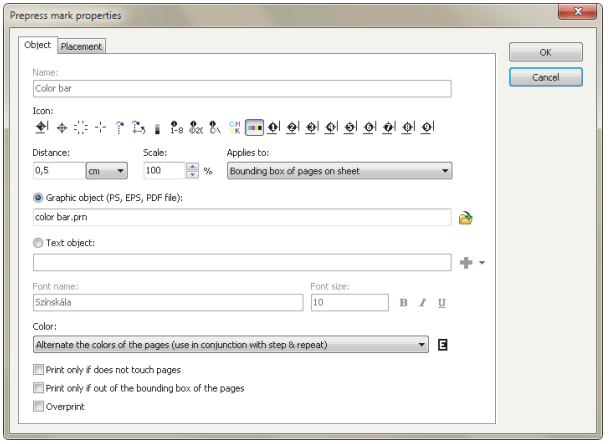
Pre-press marks can be added, removed or edited in the *Pre-press marks* window. There are the following choices:

- Make a copy of an existing pre-press mark by the *Create copy* button, in order to make changes on it, but in the same time to keep the original one too.
- Set the *Distance* or *Scale* parameters of all the marks (if no mark is selected) or of the selected ones; see detailed descriptions of these parameters below.

8.5.2 Pre-press mark properties

When adding or editing a pre-press mark, the *Pre-press mark properties* window will appear. The *Object* tab controls the global settings of the mark:

- **Name** and **icon**;
- **Distance:** this is a variable intended to be used in the Placement tab. It defines the relative distance of the mark from the page. This variable is used in the default prepress marks included with Cascade; however, but for newly defined marks it might not work well, if the distance variable is not used in the proper way.
- **Scale:** resize the mark by changing this value; 100% means the original size;
- **Applies to:** sets whether the mark will be applied to the bounding box of the pages on the sheet, or to each page;



- **Graphic object**: import a PS, EPS or PDF file, as the design for the mark;
- **Text objects:** use texts as pre-press marks, choosing the type, size and style of the font; the text can contain one or more special fields:
  - **Job name:** the name of the job, as it appears in the *Job browser;*
  - **Job style:** the name of the job style used for the job;
  - **Resolution:** the resolution, in dpi, of the job;
  - **Color name:** the name of the ink used on the current plate;
  - **Angle:** the angle, in degrees, of the current plate;
  - **Line screen:** the line screen frequency, in lpi, of the job;
  - **Dot shape:** the name of the used dot shape;
  - **Plate ink area:** the painted area, in cm^2, of the current page (useful for calculating the used ink).
  - **Plate count:** the number of (separated) plates in the job;
  - **Page count:** the number of (color) pages in the job;
  - **Sheet count:** the number of (imposition) sheets in the job;
  - **Long date** and **short date:** the date in long and short formats (e.g. "April 20, 2005" vs. "4/20/2005").
  - **Time:** the time when the job was processed.
  - **Page number(s):** the page number(s) used on the current sheet,
  - **Sheet number:** the number of the sheet, as in the *Imposition* list (i.e. the back of the first sheet is sheet #2);
  - **Side index:** 1 for even sheet numbers, 2 for odd sheet numbers; for double sided works, it is intended to mean whether it is a front or back side;

- **Sheet index:** for double sided works, meaning the number of the physical sheet (i.e. the sheet index of the back of the first sheet is still 1, not 2, as its number is);
- **Signature index:** the number of signature used on the current sheet; on double sided works, it is equivalent to the side index;
- **Signature group index:** indicates how many times a signature has been used until the current sheet; for double sided works, it is equivalent to the sheet index;
- **Primary distortion:** the pre-distortion, in percents, applied in fast scan direction;
- **Secondary distortion:** the pre-distortion, in percents, applied in slow scan direction;
- **Mirrored:** returns *Right reading* or *Wrong reading,* depending on the mirror setting of the job;
- **Negative:** returns *Positive* or *Negative,* depending on the negative setting of the job.

- **Color:** specifies the way the color of the mark will be handled:

  - **As in the file:** the mark will be placed on the sheet as-is (color or monochrome)
  - **Black, or the darkest color:** the mark will be monochrome, and the darkest color will be used (useful for crop marks),
  - **Print on each color of the page:** the mark will be monochrome, but will appear on each color (useful for registration marks),
  - **Alternate the colors:** the mark will be monochrome, and printed consecutively in each color, as it is repeated (useful for color bars),
  - Cyan, magenta, yellow and black;

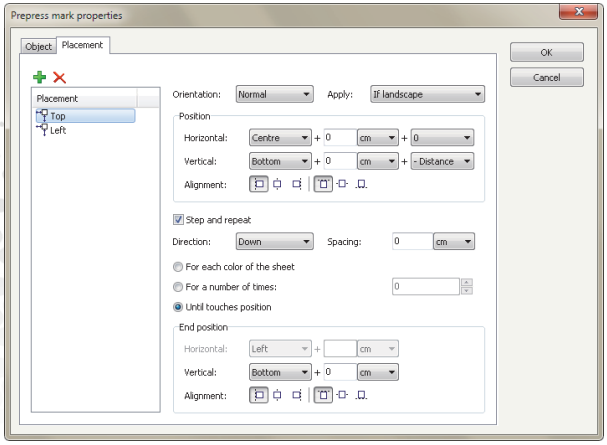
- **Print only if it does not touch pages:** the mark will be printed only if it does not touch the pages (but it may touch other marks);
- **Print only if out of the bounding box of the pages:** the mark will be printed only if it outside the bounding box of the pages (useful for external crop marks).
- **Overprint:** overprints the mark. If not checked, the imposition module will erase the background under the entire rectangular area (technically, the page) of the pre-press mark. Recommended settings are off for color scales, but turned on for crop or fold marks.

The placement tab controls how the mark will be placed on the sheet. Marks usually have several placements (for example, a crop mark will be placed in 8 different locations, two at each corner of a page).

A new placement can be added with the *Add placement* button. Once added, assign it a name (such as *top left*), and then define it with the following parameters:

- **Orientation:** the orientation of the mark in the current placement;
- **Apply:** specifies if this placement will only be applied if the page is landscape, portrait, or both. This can be used, for example, to place a mark on the longer side of the page by adding two placements, one being applied only if the page is portrait (and will be placed on the left side, for example), the other one being applied only if the page is landscape (and will be placed at the top, for example).
- **Position:** this is relative to the bounding box of the pages or to each page (depending on the setting in the *Object* tab).

  - **Horizontal** and **Vertical** position. The first pair of fields define what the mark will be positioned relative to: *Left, Center, Right* respectively *Top, Center, Bottom* are self explanatory. The *Left fold* position means the centre of the space between the current page and the previous one (where usually the fold marks are placed), similarly the *Right fold, Top fold* and *Bottom fold* options mean the centre of the right, top or bottom space. The second pair of fields can specify custom offsets. The last pair of fields can specify offsets using the *Distance* variable, defined in the previous tab. The use of this variable is highly recommended, because it simplifies positioning.



- **Alignment:** Having defined the horizontal and vertical position lines of the mark (above), the *Alignment* defines how the mark will be placed relative to these lines: left, centered, right, respectively top, centered, bottom.

- **Step and repeat:** using this option, an object can be step and repeated in the following ways:
  - **For each color of the sheet** (which for a CMYK job would mean 4, for example),
  - For a given **number of times** (which can be specified),
  - **Until touches position:** the mark will be repeated until a certain position on the page is reached;

- **Direction** and **spacing**: the direction of the step and repeat can also be specified, as can the spacing between the marks;
- **End position:** when using the *Until touches position* option, the position, which the mark must not touch, should be specified.

8.6 BLEED

8.6.1 Understanding bleed

When a work has design elements touching the edge of the page, a special problem appears: there can be shift errors of a few tenths of millimeters (but sometimes even a few millimeters) due to inaccuracies of the printing and the cutting processes: the edge of the cut page will not fall exactly on the edge of the design elements, leaving thin white borders at the margins.

The problem is avoided by the designers using an extra area of a few millimeters around the page, as an extension of the intended design. This will offer some tolerance with the cutting precision – even if the cut falls some 1-2 millimeters from the intended place, the white border will not appear. This area is called *bleed*.

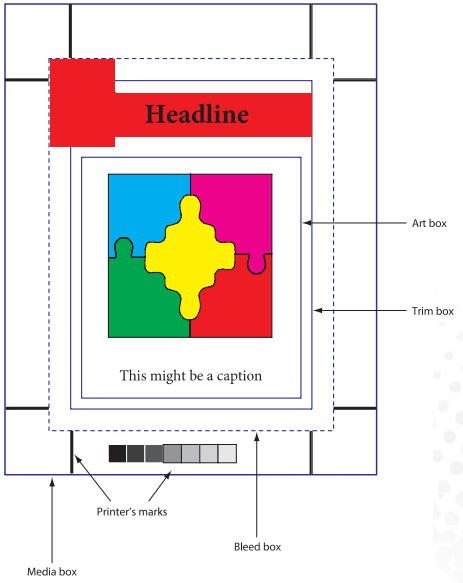
The pictures below illustrate bleed; the first without bleed, and the second with bleed.

Handling the bleed is extremely important for imposition programs. The imposition module must know where the intended trim area is (so that it can position the crop marks correctly), plus, it must be able to handle the bleed area, including it on the final print where it is necessary.

So the ability to handle the bleed does not mean that the RIP will automatically create an extension to the design – this has to be done by the designer, it means that it has to be able to work with two page sizes: the *trim box* and the *bleed/media box*.

Artwork without bleed *(left)* and with bleed *(right)*

The problem with the bleed is that the PostScript language does not have direct support for it (not even the Level 3 release), i.e. there is no standard way for a design application to create a PostScript file, containing both the *trim box* and *media/bleed box* sizes – it will contain only the size of the page. Fortunately the newer versions of PDF have support for bleed, providing a more automated way of working with it.



The picture above shows how the different boxes are defined in the PDF file. The important one is the *trim box,* which stores the size of the intended final size of the printing; this is the box the imposition relies on.

8.6.2 Using bleed with Cascade

It is very important to understand that in Cascade the bleed is by default invisible. This is because the size of the sheet is set to the *trim size* (i.e. the intended final size of the job), so the bleed area falls outside the sheet and is therefore invisible. The bleed becomes visible when it is on the sheet. Normally this happens in all the cases when it is needed, particularly when using pre-press marks, imposition with gutters, etc.

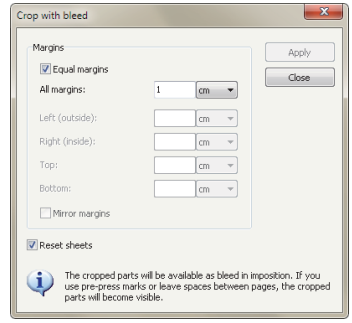
If there is any doubt about whether there is bleed available in a job, put the crop marks on, and compare the result to the previous picture (chapter *8.6.1 Understanding bleed*).

With Cascade, there are three ways of working with bleed:

- The newer design applications (e.g. InDesign, Corel Ventura) are able to create PDFs with bleed. This means that if the designer has set up the right page size in the design, and has designed a bleed area around the page, the design application will create a PDF file which apparently (viewed in Acrobat Reader, for example) will show a bigger page than the real page size, but will contain the *trim box* information which will describe the original page borders. Cascade then can open this PDF file, will automatically detect the two different sizes, and will handle the bleed correctly.
- Several design applications (e.g. QuarkXPress, InDesign) offer the possibility to set up a bleed area around the page on printing, adding this extra area to the page size. This will mean that the original page size will be lost – however, specifying the same bleed size in Cascade, it can be re-calculated. If the design application cannot automatically create a PostScript file with bleed, a page size that is equal to the original page size plus the size of the bleed area, must be specified manually when creating the document. For example, by adding an extra 1 cm bleed area to the page size, the 1 cm bleed can be cropped back in Cascade, and then treated as bleed area. This can be done when the file is opened (using the *Reduction from page size* option of the *Job style* window, see *6.2.10 Imposition task ‹page 59›*), or after the file is processed (using the *Crop with bleed* item of the *Imposition* menu, see *8.6.3 Using the Crop with bleed command ‹page 92›*).
- The third workaround is to specify the original page size on print (without bleed), and then to instruct Cascade's job style to expand this page size with a certain bleed area. The problem with this workaround is that several applications, such as the QuarkXPress, place the design in a clip box, so even if the bleed information exists in the PostScript file, it will be erased by the clip box. However, there are several applications which work fine with this approach (CorelDraw, for example). This can be done when the file is opened (using the *Enlarge page size* option of the *Job style* window, see *6.2.4 Sizing task ‹page 53›*).

8.6.3 Using the Crop with bleed command

The *Crop with bleed* command can be accessed from the *Imposition* menu, and it will be applied to the selected job. As its name suggests, this command cannot extend the processed area, so if bleed information does not exist in the processed data, it has no effect.



It is useful if the processed pages contain the bleed area too, and need to be cropped to the original size of the page, effectively transforming the cropped area into bleed area.

The crop will be performed on the entire processed size of the page rather than on the visible page size. This will have two consequences:

- Subsequent crop commands will not decrease the size of the page (accumulating the crop sizes),
- Specifying bleed values of 0 will remove the bleeds, reverting to the original page size.

The command will be applied to the selected job (in this case implicitly to all the composite pages), or to the selected separation or composite pages. If the **Mirror margins** option is checked, for pages with even index the **Left (outside)** value will mean the left side, the **Right (inside)** value will mean the

right side, while for pages with odd page index the left and right margins will be swapped.

Having the **Equal margins** option checked, the same amount will be cropped from the left, right, top and bottom of the page, as specified in the **All margins** box.

The **Reset all sheets in job** option will re-initialize the imposition sheets before the crop operation, such that each sheet will contain one composite page, the size of the sheet being equal to the page size without the bleed. If left un-ticked, the cropped pages are displayed using the current imposition scheme.

8.7 EXAMPLES

8.7.1 Simple 2-up

Supposing two A4 pages, without bleed, which have to be put on the same A3 page.

- Print both pages, using the intended final print size (A4 in this case), as consecutive pages of the same job.
- Cascade will rip the jobs,
- Select the processed job in the *Job browser* window,
- Click on the *Imposition* button or menu item, the *Imposition style* window will appear,
- Set the *Number of columns* to 2,
- Select the pre-press marks to be used,
- Press the *Apply* button,
- Check the imposition in *Imposition* view.

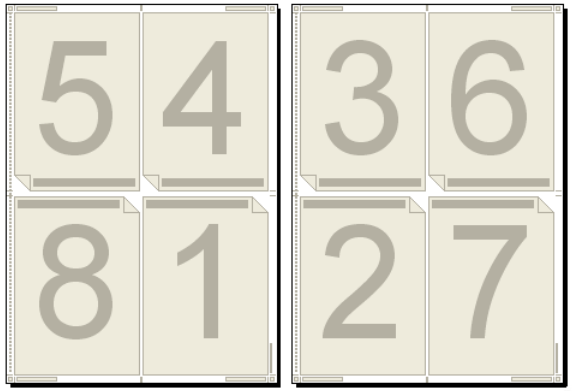
8.7.2 Step and repeat 2-up

Consider the situation above, but with only one A4 page, that – for economical printing – will be placed as two copies on an A3 sheet.
In this case perform the same steps as above, except Check the *Cloned pages* box, before pushing the *Apply* button.

8.7.3 Simple book 4-up with gutters

Consider a book with 240 pages of A5, without bleed, with a *collate and cut imposition* requested, with 0.2 mm vertical and 0.5 mm horizontal gutters.

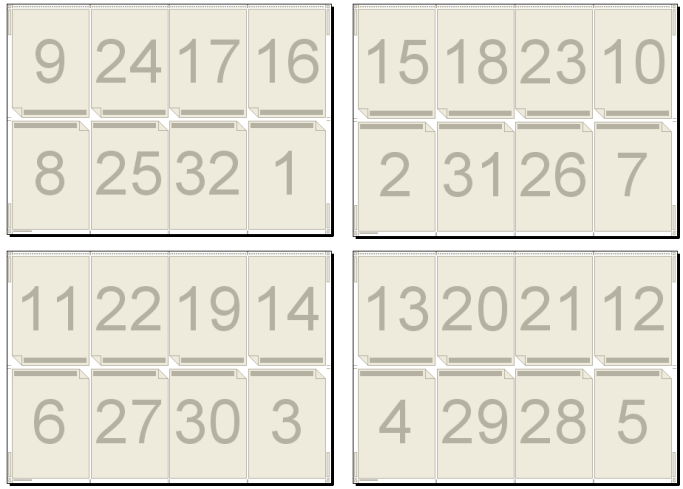
- Print the work on the intended final print size (A5 in this case), including all 240 pages,
- Process it in Cascade,
- Select the processed job in the *Job browser* window,
- Click on the *Imposition* button or menu item, the *Imposition style* window will appear,
- Set the *Number of columns* to 2, and the *Number of rows* to 2,
- Set 0.2 mm as *Vertical gutter*, and 0.5 mm as *Horizontal gutter*,
- Select *Collate and cut* in the binding box,
- Select the pre-press marks to be used,
- Press the *Apply* button,
- Check the imposition in the *Imposition* view.
- By selecting the Arrow tool (to the left of the preview window), and then selecting the sheets, two signatures will appear: the odd sheets will have the first signature (pages 5, 4, 8, 1), the even sheets will have the second signature (pages 3, 6, 2, 7).
- By selecting the Zoom tool (exiting the signature view), it is possible to see how the printed sheets will look.



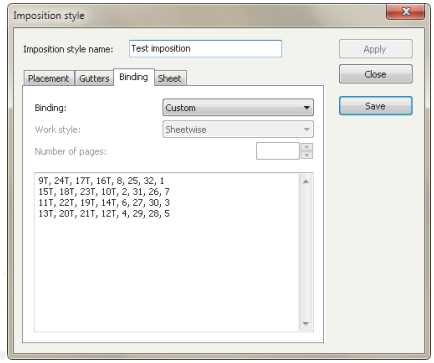
8.7.4 Complex book imposition

Consider an A5 book being printed on an A2 offset machine, with the following binding scheme: the double-sided A2 sheets are grouped in pairs (sheet 1 with sheet 2, sheet 3 with sheet 4, and so on), these pairs of sheets are then folded as in a simple collate and cut scheme, resulting in 32 book pages for each sheet pair. In addition, different vertical gutters will be needed: 0.5 cm in the middle, 0.2 cm for the left and the right gutters. The horizontal gutter will be 0.5 cm.

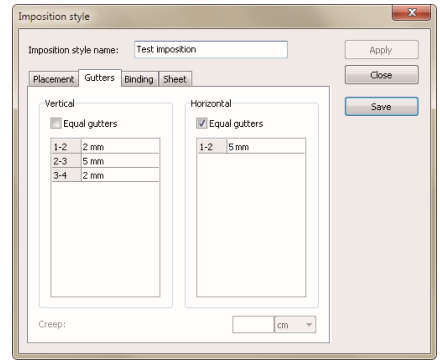
Obviously there will be 4 signatures needed, as follows:



As there is no built-in imposition scheme for this situation, *Custom* binding will have to be used. Enter the pages of each signature in one line, ignoring the fact that the pages of the signatures are in several rows. For the pages turned upside down, a *T* has to be entered after the page number.



Not forgetting to specify 4 and 2 as the number of columns and rows. As the vertical gutters will be different, uncheck the *Equal distances* box, and fill the gutters table:



8.7.5 Saddle stitched magazine

Consider a magazine with 36 pages of A4, with the following binding technique: 9 double-sided A3 pages, with two A4 pages on each side, which will be collected, stitched at the saddle, and then folded.
To do this:

- From the DTP application, print the job at the intended final print size (A4 in this case).
- Process it in Cascade,
- Select the processed job in the *Job browser* window,
- Click on the *Imposition* button or menu item, the *Imposition style* window will appear,
- Set the *Number of columns* to 2,
- In the *Binding* box, select *Saddle-stitching*,
- Enter manually the number of the pages in the job, in this case 36. This is very important.
- Select the pre-press marks to be used,
- Press the *Apply* button,
- Check the imposition using the *Imposition* view.

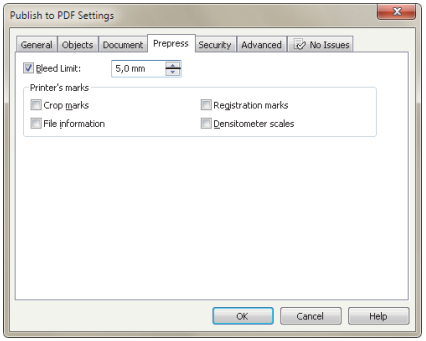
There will be 9 signatures, each one referring to the pages by their absolute page index (i.e. #1 meaning explicitly *Page 1*, and not the first page of each signature cycle). Use the # sign before the page number each time when referring to an absolute page number, and not a page index in the signature.

8.7.6 Imposition with bleed using PDF files

- Set the page size in the design application (InDesign, QuarkXPress, CorelDRAW etc.) to the intended final cropped size of the page, and

make the design extend beyond the defined page size by a few millimeters,

- Export the document to PDF, including in the PDF options a few millimeters of bleed (the picture below shows this setting for the CorelDRAW 12):
- Open the PDF file with Cascade; the bleed area will be automatically detected and processed, but it will be hidden (falling outside the sheet, which by default has the size of the cropped page);



- By putting pre-press marks on the page, making an imposition with gutters, moving the page on the sheet, or performing any other operation which brings the bleed onto the sheet, without being covered by another page, the bleed will be clearly visible.

8.7.7 Imposition with bleed using PostScript files

- Set the page size in the design application (InDesign, QuarkXPress, CorelDRAW etc.) to the intended final cropped size of the page, and make the design extend beyond the defined page size by a few millimeters,
- If the design application is able to handle bleed on print, specify the required bleed (something like 5 mm), and print the job; otherwise, calculate the exact page size of the job with bleed (in the case of an A4 page and 5 mm bleed, this will become 220×307 instead of the original size of the A4, 210×297), and specify it in the printer's page properties,
- Open the PostScript file with Cascade, or – if working through Cascade printer or hot folder – modify the appropriate job style; in either cases using the same *Job style* dialog; check the *Imposition* task, and in the *Reduction from page size* fields enter the exact bleed value specified in the design application;
- The bleed area will be cropped from the file, with the final cropped page in the on-screen preview (the bleed area falling outside the sheet);
- Instead of specifying the bleed within the job style, it is also possible to use the *Crop with bleed…* command of the *Imposition* menu, after the job has been processed.
- By putting pre-press marks on the page, making an imposition with gutters, moving the page on the sheet, or performing any other operation which brings the bleed onto the sheet, without being covered by another page, the bleed will be clearly visible.

8.7.8 Imposition with bleed using PostScript files and the expand with bleed feature

- Set the page size in the design application (InDesign, CorelDRAW etc.) to the intended final cropped size of the page, and make the design extend beyond the defined page size by a few millimeters,
- On print, specify the exact crop page size of the job (so for an A4 job with 5 mm bleed, specify the exact size of the A4, without the bleed, i.e. 210×297 mm),
- Open the PostScript file with Cascade, or – working through Cascade printer or hot folder – modify the appropriate job style, in either cases using the same *Job style* dialog; check the *Sizing* task, and in the *Enlarge page by* controls specify the bleed value (5 mm, for example);
- The bleed area will be added to the file, but this will still be invisible in the on-screen preview (the bleed area falling out of the sheet);
- By putting pre-press marks on the page, making an imposition with gutters, moving the page on the sheet, or performing any other operation which brings the bleed onto the sheet, without being covered by another page, the bleed will be clearly visible.

Some applications, such as the QuarkXPress, put the printed page into a clip box. In this case this method will be ineffective, as only a white border will be added to the page as bleed.

9 Screening

9.1 BASIC CONCEPTS

Unlike the graphics displays of computers, which can electronically control the intensity of colors, most printing equipment is not able to print shades of their colorants (ink, toner etc.) directly. Offset machines, laser and inkjet printers all use screening techniques to simulate shades. None of these techniques is a perfect solution technically, all have some trade-offs and often their combination or customization is necessary for good results. But this technology is in constant development and as a result output is steadily improving.

Consequently, the screening technique is the 'soul' of a RIP: this is the part that has the most significant effect on the output quality as well as on the processing speed.

There are several ways of simulating shades, but they all rely on two basic screening techniques:

- **Traditional (Amplitude Modulation, AM)** halftones use dots in fixed positions (a grid), and vary the sizes of the dots to control the intensity of the shade;
- **Stochastic (Frequency Modulation, FM)** screens use dots of a fixed size (usually the smallest dot size which the print engine can reliably produce), but change the density of the dots (effectively, the distances between them) to control the intensity of the shade.

Traditional halftones are still the basic screening technique, because they offer two major advantages:

- Much better color stability in mid-tones than stochastic screens, bad printing quality affecting mostly the highlight and shadows (while the stochastic screening offers constant color stability only with good quality printing),
- A smooth look on uniform colors that stochastic screens can produce only with very fine dots.

So, even though stochastic screening has some clear advantages (eliminating the possibility of several kinds of moirés, offering good color stability in highlights and shadows, and offering smooth gradients), today's printing industry still overwhelmingly employs traditional halftones. Some RIPs, such as the Cascade, use hybrid screening to improve the characteristics of the traditional half tones (best of both worlds approach).

The big disadvantage of the traditional halftone is its vulnerability to different kinds of moirés, and these will be discussed in detail in the next section.

9.2 UNDERSTANDING MOIRÉ

Moiré is a phenomenon recognized by many people but understood by few. Experienced typographers or engineers have often vague and erroneous ideas of exactly why moiré appears.

The moiré appears when two repetitive patterns are interfering, causing the disturbing moiré effect. Unfortunately in the printing industry grids and rasters are very common, so there are many opportunities for the moiré to occur. The most important ones are:

- Interference between halftone screens,
- Interference between a halftone screen and a raster device,
- Interference between a halftone screen and image elements.

9.2.1 Traditional offset angles

The traditional printing uses 15, 45 and 75 degrees for the cyan, black and magenta screens, and 0 degrees for the yellow screen. To understand why these angles were chosen, there are a few issues to clarify.

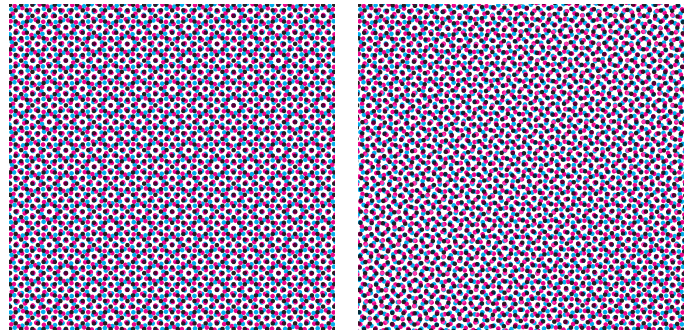
- Why the halftone screens have to be placed at different angles?
  - Pure cyan, magenta and yellow are independent colors in the color spectrum, they should not interfere with each other: the cyan filters exclusively the red light, the magenta the green light and the yellow the blue light. In a perfect world they would not interfere. However, the inks used in offset printing are imperfect, especially the offset cyan, which is very far from pure cyan (also filtering a good part of the green light), and the magenta is imperfect too. So in practice there will be a moiré between the cyan, magenta and yellow, caused by the overlapping filtering characteristics of the inks.
  - The black screen – which has to be used for a number of reasons – can cause moiré with any other ink;
  - Using two or more colors at the same angle will not cause moiré – at least theoretically –, however, it will be a huge risk for the printer: a small shift between these two screens can cause enormous color changes;
- Why exactly these angles?
  - By positioning the halftone screens with 30 degrees between them, moiré is minimized, producing the so-called *rosette pattern;*
  - However, only 3 screens can be placed this way, because the fourth would be placed at 90 degrees from the first one, which means, in practice, that they will have the same angle;
  - The lightest and purest color, the yellow is normally placed between the two darker colors: the cyan and magenta.
  - The black, as the strongest color, is placed at 45 degrees, because this is the most pleasing angle for the human eye.

9.2.2 The moiré between the cyan, magenta and black screens

Having exactly 30 degrees between the cyan, magenta and black screens produces a moiré called *rosette* pattern. Even if *de facto* this is moiré, it is so fine and pleasant to the human eye that printers do not consider it as being a moiré.

However, slight angle or frequency differences in the traditional angle scheme can cause very disturbing moiré patterns.

On the left picture there is a good rosette, on the right picture there is a flawed rosette. While the good rosette looks the same on the whole printing area, the flawed rosette is changing its structure across the printing area, causing shade differences and therefore moiré.



Older RIPs are often unable to produce accurate angles and frequencies, causing moirés for certain color combinations, especially when the color separation is made with a high black generation. The picture above is a typical 'dangerous' combination for old rips, containing the same percentage of cyan, magenta and black.

Modern RIPs are all able to produce relatively accurate screens, so the moiré between the cyan, magenta and black is usually impossible: using any CMK color combinations; the pleasant rosette pattern will appear instead of moiré.

Even some of the latest RIPs are unable to achieve the high accuracy needed to avoid problems. This happens particularly in adverse conditions like flexo angles, high line screen or low resolution.

When the necessary accuracy is not achieved, the effect is that the same color has different shades in different corners of the sheet, or, in certain cases, the moiré can be visible on the page.

9.2.3 The moiré between the yellow and other inks

The yellow ink causes trouble even with the latest RIPs. The moiré caused by the yellow ink is suppressed, and usually hardly visible for the human eye, but sometimes it becomes visible.

As the yellow is between two other inks (cyan and magenta in the traditional printing), it causes a regular moiré pattern with the two neighboring colors. This moiré pattern is clearly visible on films when placed on the light table, respectively, between the yellow and cyan, and the yellow and magenta films.

On the final print this moiré is usually almost invisible (or at least much less visible than on the films) because the cyan, magenta and yellow are relatively independent colors (the overlap between their filtering characteristics is relatively small), so in practice it is only the impurities of the inks that are causing the moiré. The first two pictures below illustrate that there is no big difference between the two extremes of the moiré in the C+Y and M+Y moirés. The moiré is oscillating between the two extremes – a light and yellowish green, or a light and yellowish pink –, but as the two extremes are almost the same, so resulting moiré won't be very obvious.

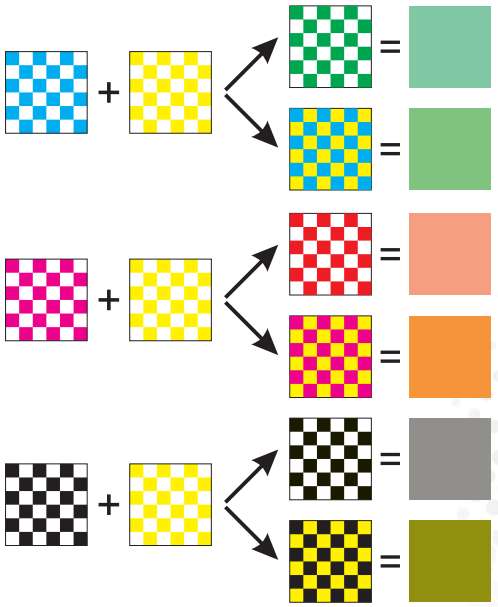
These differences can be very slight but are sometimes visible, so there are various techniques used to suppress or avoid this moiré:

- The frequency of the yellow is increased by approximately 12%; this reduces the moiré period (making it finer and so less visible), having the same effect as increasing the yellow's angle compared with its two neighbors (unfortunately a practical impossibility);
- Using elliptic dots will reduce the contact surface of the dots, minimizing the differences between the two extreme colors;
- Using higher line screens generally reduces the visibility of the moiré;
- For skin tones, the yellow is placed between the cyan and black, avoiding completely the M+Y moiré (which is often visible on skin colors with the traditional angles), replacing it with the Y+K moiré.

As the last picture above shows, of the color combinations that create the most noticeable moiré the worst is the Y+K moiré. Usually this is a rare combination, and the CMYK colors generated by the color separation profiles are not vulnerable to this effect. However, manually specified CMYK colors with strong K components may cause moiré when using the skin optimized angle scheme.

In conclusion, we recommend using the skin optimized angle scheme for works with large skin surfaces, as well as for general use, but be aware of the dangers and change to standard yellow angles when necessary.

Using skin optimized screen set may cause a strong moiré between the black and yellow inks.



9.2.4 The moiré between a halftone screen and a raster device

This moiré is caused by the interference between the halftone raster (e.g. 170 lpi) and the device raster (e.g. 2400 dpi). When this moiré occurs, it is visible on individual colors (especially visible on films, in the dark areas, when viewed on a light table). Typically the cyan or magenta screens have lines or other patterns in the 80-95% shades.

This phenomenon is exclusively caused by the dot gain of the imagesetter, platesetter or other printing equipment. If the whole printing chain could keep the pixels as sharp squares, the moiré would not appear.

To examine how this phenomenon occurs, we will consider the case of a typical imagesetter with a dot size of 20 microns at 2400 dpi. This dot size is twice as big as it should be (mathematically) for that resolution, and causes the dot distortion shown in the illustration below. The first picture shows how the RIP makes halftone dots of 5 white pixels each (so mathematically their area is the same). Once this pattern is imaged, using the oversized laser (which may not be perfectly focused), the sharp white dots become blurred, and the black runs into the white. Film designed for imagesetters typically has a very high gamma; the result is sharp dots of different sizes.

Unfortunately, for statistical reasons, the dots tend to be grouped in groups of bigger and smaller dots, and this causes the moiré effect. The dark areas are especially vulnerable, but on poor quality screen sets it can also appear in mid-tones.

As this problem does not occur on high quality print engines (such as drum imagesetters, where the dot is perfectly focused and is the right size), some RIPs, designed for such print engines, can afford to ignore this problem.

On capstan devices, a good RIP is necessary – one that provides pattern free screens even with high dot gain.

9.2.5 The moiré between the halftone screen and image elements

If there are repetitive image elements in a job (radiator of a car, texture of a jacket, window blinds, etc.), they may produce a moiré with the halftone screen.

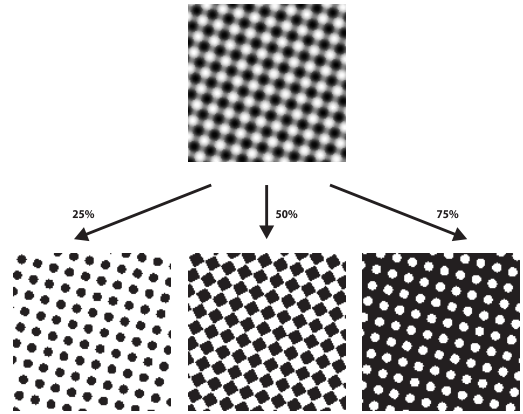
This is the typical situation where the stochastic screen comes into its own, because it is absolutely immune to any kind of moiré.

9.3 UNDERSTANDING DIGITAL HALFTONES

Digitally created halftones have some specific problems, caused by the fact that they are made by a raster device.

9.3.1 Threshold maps

Most digital halftone systems use a threshold map (halftone map) for generating halftone screens. The picture below shows a threshold map (a grayscale bitmap), converted into halftoned black and white bitmaps. The conversion is similar to the usual grayscale to black and white conversions, but uses the target gray value as the threshold level of the conversion.



If a grayscale bitmap (typically 300 dpi) is to be converted to halftoned monochrome bitmap (typically 2400 dpi), each of its gray pixels is treated as gray squares of 8×8 device pixels (assuming the resolutions above).

As the halftone map must match the resolution of the device, the threshold map covering the entire page would occupy a few gigabytes, even for an average imagesetter or platesetter. Just storing this sort of information would be a problem, not to mention the time needed to generate it. So the halftone map is tiled.

A tile for an obliquely angled halftone consists in two squares; the tangent of the side ratio gives the tiling angle, and this is equal to the ratio of the sides of the two squares.

By storing two bitmaps (corresponding to the two straight squares on the picture) allows the RIP to reproduce the whole halftone map by tiling (see the oblique rectangles). Because they are bitmaps, their sides have an entire number of pixels, typically 0-20 pixels.

9.3.2 Angle inaccuracy

It is a simple mathematical fact that with three angles required, with 30 degrees between them, at least one will result in an irrational ratio between the sides of the squares. For example, to produce a 30-degree halftone, the ratio between the sides should be tan(30), which is an irrational number (i.e. cannot be a ratio of two integers). In other words, with this tiling technique, an angle of exactly 30 degrees cannot be achieved. Similar problems occur for each different screen frequency at given angle.

This phenomenon will cause moiré between the colors: as the sides of the squares have to be whole numbers, and therefore have to be rounded up or down, the resulting screen angles and frequencies are only rough approximations, with the result that they are vulnerable to moiré.

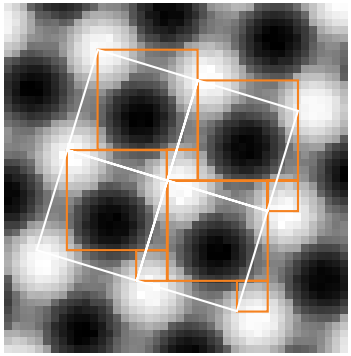
In the late 80's the rip manufacturers searched for angle combinations that minimized this moiré effect. At the same time, low black generation became an industry standard when performing color separations: the black was used only for dark colors, lowering the likelihood of producing moiré with the other colors.

9.3.3 Supercells

The breakthrough came at the beginning of the 90s, when a few RIP developers succeeded in dramatically improving the quality of digital halftones by using supercells. This technique soon became an industry standard, and today's RIPs are all using their own version of this techniques to produce moiré free halftones.

However, the problem was still far from solved. A quote from the user manual of one of the world's leading RIPs shows that problems still exist: "If you find that you are not getting consistent dot or clear-centered rosettes across the full width of the page: try varying the requested frequency slightly, or increase *Maximum frequency deviation* to allow Express RIP to find a screen set with better angle and frequency accuracy."

The main source of problems is that these supercell techniques are usually trying to approximate irrational numbers with rational ones, but the result is still just an approximation (though there are exceptions too, see later). The moiré effect is usually not completely erased, it is just pushed outside the page – but sometimes this fails, and the moiré remains on the page.



This may mean a visible moiré pattern (see the quote above), but usually it just means inconsistent rosettes (causing color variation within the page).

Theoretically the use of large supercells would solve this problem, as increasing the size of the supercell would increase the accuracy of the angles. However, large supercells raise not just speed problems (generating and using large supercells may be slow), but will also increase the likelihood of patterning (see below).

9.3.4 Patterning of individual colors

Quote from the same user manual: "Decreasing the *Angle accuracy* or *Frequency accuracy* settings [...] also gives Express RIP more freedom in selecting a screen, and may produce patterning on individual films, but this may also *increase* the likelihood of *moiré* effects between plates".

The "patterning on individual films" term above is referring to the moiré effect described in chapter *9.2.4 The moiré between a halftone screen and a raster device*. The quote shows that the problem still exists and is quite serious.

One approach to correct this problem would be to use dots of the same shape, but this would move the 'center of gravity' of the dots from their mathematically ideal place, and the human eye seems to be very sensitive to this.

Another approach would be to anticipate the distortions and apply a predistortion to the dots; in theory the resulting dots would have the correct size on the final print. However, we consider this approach too dangerous, as the immediate result of any technological problems (causing different distortions than expected) would be the appearance of patterning.

The solution, adopted by the majority of the RIP manufactures, is to only use certain, well-tested screen sets, which fortunately are not vulnerable

to this moiré phenomenon (because the dots are well dispersed). It imposes limitations and is an area where improvements are needed. Cascade's advanced screening techniques succeeded in making these improvements.

9.3.5 Limited number of shades

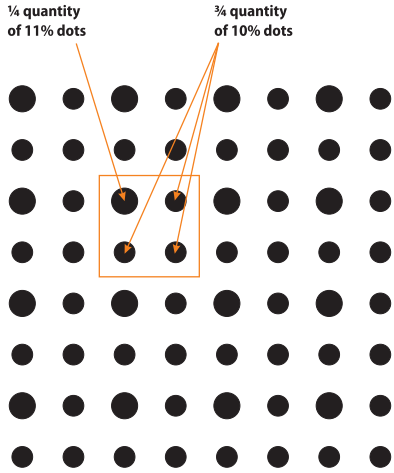
Another well-known problem of digital halftones is that the number of shades on a given device resolution is limited by the possible sizes of a halftone dot. This is expressed as:

$$number\ of\ shades = \left(\frac{device\ resolution}{screen\ frequency} \right)^2 + 1$$

For the typical 170 lpi @ 2400 dpi, this means 200 shades, for lower device resolutions or higher screen frequencies this could be even less. However, to achieve a smooth gradient, at least 1000 shades are needed.

The answer to this problem arrived together with the supercell technology (which also solved the moiré problem), and became the current de facto industry standard. If the possible sizes of the halftone dots are very limited (due to high line screen on low resolution) – for example, there is no intermediate dot size between 10% and 11% –, an intermediary shade of 10.25% can be achieved by using 10% for three quarters of the dots and 11% for the other quarter of the dots, distributed evenly.

This technique was a breakthrough in its time, because this was the main obstacle to using high screen frequencies. With this technology, line screen frequencies of 180-200 lpi can easily be reached at 2400 dpi without losing shades, when previously these frequencies were restricted to higher resolution machines.



9.3.6 Poor highlight and shadow quality

The problem of poor highlight and shadow quality is another problem for traditional halftones, because most print engines have problems handling small dots. When the size of the black or white dot falls below a critical value, the technology will be unable to reproduce it (the dot will be lost on the film, plate or paper).

Some RIP manufacturers are unable to find solutions for this problem, but most RIP manufacturers use the gray enhancement technique (presented in the previous chapter) to overcome this problem, using it in the special case that the bigger dot size is equal to the minimum allowed dot size, and the smaller dot size is zero.

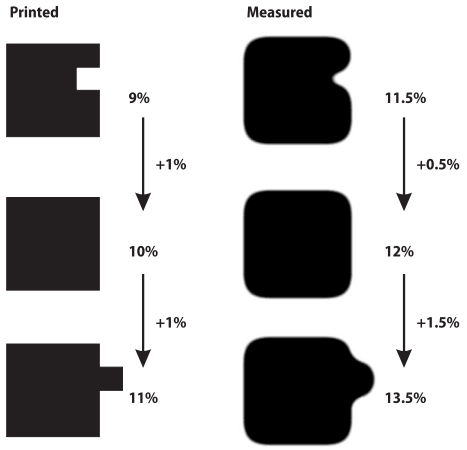
The problem with this approach is that if the range of shades to achieve is high (for example, the minimum dot size the print engine is able to reproduce is 8%, so the 0-8% range has to be achieved by the gray enhancement technique), a big supercell has to be used, and therefore an offensive pattern will appear if the dots are ordered.

The innovation of the technique Cascade uses to avoid this problem is that instead of using an ordered pattern (as the one presented in the picture), a stochastic approach is used, avoiding any disturbing patterns.

9.3.7 Tonal jumps

Finally, there is the problem of tonal jumps. This is caused by the distortions of the print engine: the intended (mathematically computed) and the real (measured on the film) sizes of the dots are not in a linear relationship. Adding one pixel can increase more or less the real size of a halftone dot, depending on the current shape of the dot, and the position of the newly added pixel. A pixel, which should add 1% to a halftone dot, can sometimes add only 0.3% on the film, at other times the same pixel added to another halftone dot, in a different position, can add 2-3%. This phenomenon can be amplified by the dot gain on the paper.

A very strong tonal jump can occur at 50% when using the Euclidean dot shape: approaching 50%, the dots should have square shape, and as the dot percentage increases, the corners of the dots will come into contact with each other. The dot gain will distort the linearity of shades where the dots are in contact with each other, producing a jump when the corners are close enough. The human eye will easily perceive this non-linearity of the gradient.



Many RIPs do not offer a solution to this problem. Cascade uses a low-pass filtering technique to avoid the tonal jumps.

9.4 UNDERSTANDING STOCHASTIC SCREENING

Stochastic screening is also known as FM (Frequency Modulated) screening. It uses a fixed dot size (usually the smallest size that the printing equipment can consistently produce), but varies the density of the dot pattern to achieve the desired shades. Technically, the frequency of the dots is modulated in proportion with the intensity of the shade being reproduced.

9.4.1 Advantages

Using FM screening has a number of advantages compared to the AM screening:

- All moiré is eliminated (especially the moiré between the image elements and the halftone screen, as well as the moiré between the colors).
- Under a dot size of 40 µ, the dots will become practically invisible for the human eye, but can be still safely reproduced by an offset machine.
- The image generally becomes sharper.
- This technique suits certain devices (like inkjet printers, which do not have a fine control over the size of the dot, but can safely reproduce a given, fixed dot size) much better. They can achieve better image quality by frequency modulating a constant dot size.
- Print technologies like the flexography or serigraphy have additional moiré problems with AM screening. FM screening resolves these problems too.

9.4.2 Disadvantages

FM screening is still little used in the field. This is explained by the following disadvantages:

- In the case of AM screening, poor printing quality affects only highlights and shadows. With FM screening it affects the whole tonal range.
- Uniform colors have a noisy (grainy) appearance as compared with AM screening.
- Using imagesetters, the small dots used by the stochastic screens are easily lost when transferred to the plate (using CTP systems, however, the dots are safely reproduced on the plate).
- Advanced AM screening technologies (combined with stochastic highlight/shadow protection) enable the use of line screens of 200-300 lpi on offset machines, offering better and more consistent results than the equivalent FM screening.

9.4.3 First order FM screening

The first order FM screening, inspired by the Floyd-Steinberg algorithm, builds a threshold map by placing the pixels to present a smooth, dispersed look. The obtained threshold map is then magnified to reach the needed dot size (typically using dots of 2×2, 3×3 or 4×4 pixels by 2, 3 or 4 times magnification).
This technique has a number of disadvantages:

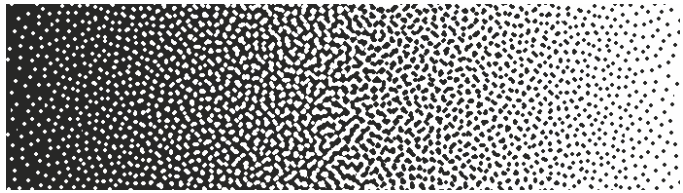
- The dots are squares rather than circles (inevitably distorted by the offset machines).

- The dots can be placed only at certain positions (using 2x2 pixel dots, for example, the dots can have only even coordinates). This ordered placement will cause a moiré on slight registration errors.
- The so-called 'chessboard' effect will appear near 50%, which will cause local plugging, and therefore unstable and noisy tints.

9.4.4 Second order FM screening

The second order FM screening techniques try to overcome the problems mentioned above. There are several different second order techniques used by RIPs, but their common characteristics are as follows:

- The dots are freely placed (avoiding moiré on registration errors).
- Typically, over 20%, the size of the dots will be grown rather than adding more dots to increase dot density.
- The chessboard effect is avoided, usually, by the so-called clustering effect.



The major improvement of the second order FM screening techniques is in their abilities to produce shapes which can be well reproduced by the print engines (rounded, thick, robust shapes rather than angular, thin, fragile ones), but at the same time offering a smooth, pleasant look.

9.5 CASCADE AM SCREENING TECHNIQUE

The AM (amplitude modulated) screening is the traditional halftone technique, which uses a fixed grid of dots, changing their size in order to achieve the desired shades (which technically means that the amplitude of the dots is modulated with the intensity of the shade).

From the outset, our objective was that Cascade's AM screening technique had to comprehensively and effectively overcome the problems described in the previous chapters. When designing Cascade's screening technique, the following clear goals were set:

- Consistent rosettes to be achieved, even on large pages and high line screens,
- Freedom for the user to choose angles and frequencies,
- Imperceptible patterning to the human eye, even on low quality print engines,
- 4096 shades of gray for practically any line screens,
- Good color stability in highlights and shadows, even on low quality print engines,
- Perfectly smooth gradients,
- Very high rendering speed.

9.5.1 High rendering speed

High rendering speed demands that the fastest technique possible is used. This meant supercells had to be used with a fully optimized algorithm. Rasterizing bitmaps or vector objects can be done without complex mathematical operations: the resulting halftone is already computed and is available in memory – it just has to be tiled. This approach offers the possibility of rasterizing full-page bitmaps in tenths of a second.

9.5.2 Consistent rosettes

The main problem of the supercell technique is that to achieve the angle and frequency accuracy that offers consistent rosettes over large pages, huge supercells are necessary. However, huge supercells mean much slower speeds, high memory needs, and vulnerability to patterning.

With this in mind, RIP designers usually try to find 'lucky' screen sets, ones which offer good accuracy with relatively small supercells (usually less than 20×20, but not more than 50×50 halftone dots). Unfortunately there are very few of these screen sets, and most are not very good. So, in most cases these RIPs are either using very few 'recommended' screen sets, or – in cases where there are many screen sets offered – the quality is inconsistent throughout the set (or certain screens are selectively recommended only for specific print engines).

Cascade takes a different approach: it has proven that perfect rosette can be produced not just by the traditional angle scheme, but by angles and frequencies that deviate slightly from it. From this point of view, searching for an accurate approximation of each of the angles is not the ideal approach: the search should be oriented to finding values that *together* produce accurate rosettes instead.

Cascade developed a formula for this; it calculates the consistency of the rosettes for deviated frequencies. Using this formula, and surrendering the

obsessive requirement to find accurate approximations for each of the angles, dozens of screen sets with perfectly consistent rosettes can be found for each line screen frequency.

9.5.3 Filtering out the patterning

Having many available moiré free screen sets is very useful, because it will be needed to address the problem of patterning (presented in the previous sections 9.2.3 ‹page 99› and 9.3.4 ‹page 101›). That is because the approach Cascade screening takes to overcome this is based on the empirical observation that some screen sets seem to have 'immunity' to this patterning phenomenon. Analysis revealed that on some angles the dots of different shapes are distributed evenly, and then there are no visible groups of bigger or smaller dots.

In the practice, this means that the possible screen sets will have to be filtered, in order to avoid patterning on individual films: a considerable part of the available screens will be disregarded (because they are dangerously prone to patterning). However, given the large number of available screen sets, there will be perfect quality screen sets even after the filtering process, giving to Cascade users the freedom to choose accurate dots for their needs.

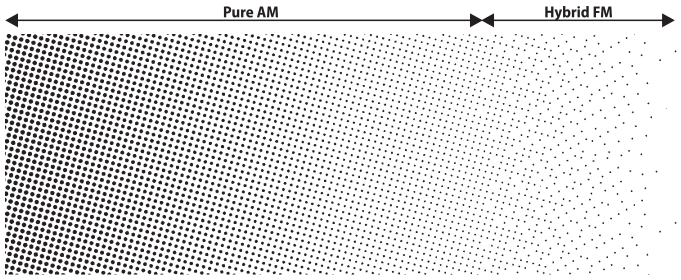
9.5.4 Gray enhancement

Gray enhancement overcomes the problem of the limited number of gray shades. Cascade relies on supercell technology for its gray enhancement. The novelty of Cascade's technology is that it uses large supercells with stochastic patterns rather than small supercells with regular patterns. This means that there will be no disturbing patterns in the grays even on very high line screens – the stochastic technique will always offer a smooth look.

Cascade's gray enhancement eliminates the need to apply a typical workaround for the limited gray levels problem: using high resolutions. Line screens of up to 300 lpi can easily be achieved on 2400 dpi without losing shades. Moreover, on high quality drum machines, line screens of 150-180 lpi can be used safely even on low resolutions such as 1200 or 1800, and gradients will still look smooth and perfect.

9.5.5 Great highlight and shadow detail

Cascade achieved greater highlight and shadow detail by using a hybrid technique: in the extreme shades, Cascade combines FM technology with the AM screens. The minimum dot size that the RIP can produce is set within the controls. If the requested dot percentage falls below the specified limit (for example 4%, as on the picture below), instead of reducing the dot size, the dots are stochastically removed (the pattern is thinned).



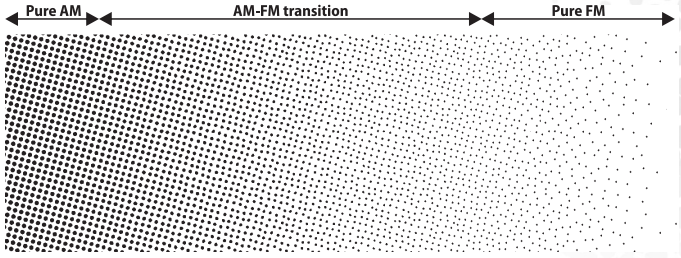
Cascade's hybrid screening is probably the best technique available because it is stochastic, and therefore produces a pleasant and smooth look. Regulated patterns used by many other RIP solutions offer a much less pleasing look.

9.5.6 Increased highlight quality for flexo

Reproducing highlights is a key problem in flexography, as there is often huge dot gain in this area (typically 2% will print as 10-15%). Therefore having good color depth and pattern free halftones in this area is critical.

The standard Cascade hybrid screening, as presented in the previous section, offers the desired color depth, but even though it is stochastic, the FM part isn't entirely pattern free. This isn't a problem in offset, where the hybrid screening protects only the highlights under 2-3%, and the slight pattern is practically invisible. However, with the huge dot gain of flexo, it may become visible and offensive.

Therefore SGSS (Second Generation Cascade Screening) offers a hybrid screening optimized for flexo, increasing the quality of the FM part at the expense of slightly decreased quality in the AM part. Using a principle that allows the centers of the halftone dots to slowly drift away when the percentage falls below a given level (typically 30-35%), reaching an entirely stochastic structure at 3-5%. Removing dots from this stochastic grid will become practically imperceptible, thus visible patterns will disappear almost entirely.

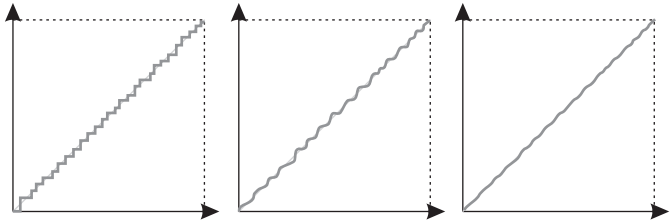


9.5.7 Low-pass filtering of the tonal jumps

The tonal jumps (described in chapter 9.3.7 ‹page 102›) are smoothed by Cascade using a low pass filtering technique: for example, to achieve a 50% tint, the rip uses 48, 49, 50, 51 and 52% dots, distributed stochastically. The bandwidth of the filter can be explicitly specified. A wider filter will cause smoother gradients, but also noisier tints.

Using low-pass filtering is especially important on old capstan machines or any other devices with high dot gain. The noise introduced by a filter bandwidth of 2-4% is imperceptible, while the improvements are spectacular.

This technique also smoothes out the abrupt change in density caused when halftone dots start to touch – there is no need to use elliptic dots to distribute the shock, the low-pass filtering distributes it well.


insufficient gray levels: visible steps
4096 gray levels, no filtering: no steps, visible tonal jumps
4096 gray levels, low-pass filtering: smooth, linear output

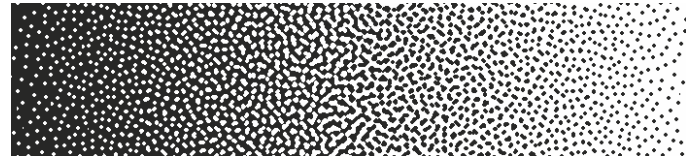
9.5.8 Other advantages of the stochastic technique

Finally, the use of these stochastic techniques has a few other advantages. For example, on print engines that have banding or other similar problems (such as many capstan imagesetters with vibration problems, or drum imagesetters with carriage rail problems), the problem can be masked by the careful use of slight stochastic noise over the raster.

9.6 CASCADE FM SCREENING TECHNIQUE

9.6.1 Second order stochastic screening

Cascade uses a second order stochastic (FM) screening technique. This technique is optimized for the press industry, and is less suitable for inkjet printers. The power of this screening technique relies on round or rounded dot shapes which are generated by high resolution digital devices like CTPs or imagesetters, and then are easily reproduced by analog technologies like offset printing, flexography or serigraphy.



9.6.2 High rendering speed

Cascade uses exactly the same threshold map based technology for FM screening that it uses for AM screening, so it can offer the same very high speed as it does for traditional halftoning.

9.6.3 Moiré free screening

The stochastic screen of Cascade overcomes all the possible moiré effects, including:

- moiré between image elements and screen,
- moiré between different inks,
- moiré between the edges of the dots (see the 9.4.3 *First order FM screening* ‹page 103›).

Instead of moiré, a noise will appear on overprinted inks. Using small dot sizes, this noise will be fine enough to be imperceptible and pleasant to the human eye.

9.6.4 Smooth look

A special filtering technique enables Cascade to produce very smooth tints with FM screening, suppressing considerably the specific blue noise of stochastic techniques. Individual films (and therefore the stand-alone colors) will be almost as smooth as with the traditional halftoning, and the noise will only appear on overprinted inks (in other words, mixed colors).

9.6.5 Round and rounded dots

Unlike many other stochastic screening technologies which typically use squares, the stochastic screening of Cascade produces real round dots (if a minimum of 3 × 3 pixel dot grid is used), and it also optimizes the dot placement to form, when possible, rounded shapes without sharp angular corners or thin lines.

In order for Cascade to achieve very smooth dot shapes, the recommendation is to work on high resolution to allow the RIP to use at least 4×4 pixel dots. However, even if dots of 2 × 2 pixels have a square shape, they still produce rounded clusters with a pleasant look.

9.6.6 Different black and white dot size

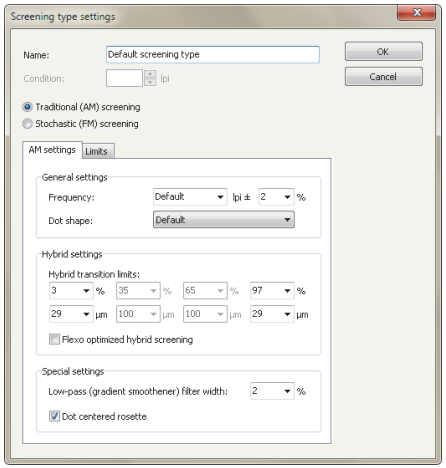
A unique feature of Cascade's stochastic technique is the ability to use different dot sizes in the highlights and shadows. This is useful because the dot gain of the CTP, imagesetter or press usually increases the size of the dots in the highlights, and reduces the size of the dots in the shadows (which, in extreme cases, causes the plugging effect). Using bigger dots in the shadows than in the highlights enables Cascade to achieve the same black and white dot size on the final printing.

9.6.7 Flexibility

Another unique feature is that Cascade lets the user optimize the stochastic dot for the specific needs of the intended output technology (see *9.7.2 FM settings tab ‹page 108›*). The resulting screen can be easily tested (see *9.8 Test screen window ‹page 109›*).

9.7 SCREENING TYPE SETTINGS

The default Cascade screening parameters are optimized for generic offset use, so most users will have to specify only the line screen frequency. However, using the *Screening type settings* dialog it is possible to fine tune the screening for the special needs of each printing technology or each job.
The following settings are available:



- **Name:** the name of the screening type, as listed in the *Screening type* list of the *Screening* task in the *Job style* window.
- **Condition:** specifies for which objects of the PS/PDF/EPS file the current screening type should be used. A line screen frequency can be assigned for each screening type, a screening type being used if the line screen of the given object matches the line screen specified as usage condition. There is always a default line screen, in which the usage condition box is grayed out. See more in *6.2.9 Screening task ‹page 57›*.
- **Traditional/stochastic screening:** specifies whether traditional (AM) or stochastic (FM) screening will be used.
- **AM/FM settings:** the detailed settings for each screening type.
- **Limits:** allows the user to define upper and lower screen limits (e.g. limiting the maximum tint to 90%, common in the gravure industry, or knocking out tints below 2%, common in the flexo industry).

9.7.1 AM settings tab

The AM settings tab defines the parameters of the traditional (AM) screening. The following controls are available:

- **Frequency:** the line screen frequency, in dpi, of the halftone. Specifying *Default* will use the global line screen frequency value (defined in the job style dialog or coming from the PostScript file). It is strongly recommended that this value is kept and used, change it only in special situations, when a second, different line screen is needed than the default one.
- **Frequency tolerance:** unless a very accurate line screen frequency must be achieved for special reasons, leave it on 2%: Cascade needs the freedom to choose the best screen set in the proximity of the required one (e.g. in case of 170 ± 2%, it will search for the best screen set in the 166.6–173.4 lpi range for the best quality screen set). Limiting this freedom may lead to quality problems (patterning on individual films, inconsistent rosettes), while leaving it on 2% Cascade guarantees consistently perfect quality.
- **Dot shape:** the shape of the screen dot. Specifying *Default* will use the global dot shape value (defined in the job style dialog for coming from the PostScript file). It is strongly recommended that this value is kept and used, change it only in special situations, when a second, different dot shape is needed than the default one.
- **Hybrid transition limits (flexo option OFF):** specify the minimum and maximum allowed size (in percents or microns) of the screen dots. As a result, the halftone will have the following phases:

- Pure AM (e.g. 3–97%): the dot has a perfect grid structure, and acts like a traditional halftone dot.
- Pure FM (e.g. 0–3% and 97–100%): instead of the dots getting any smaller than the specified limit, they are stochastically removed. See more in *9.5.5 Great highlight and shadow detail ‹page 105›*.

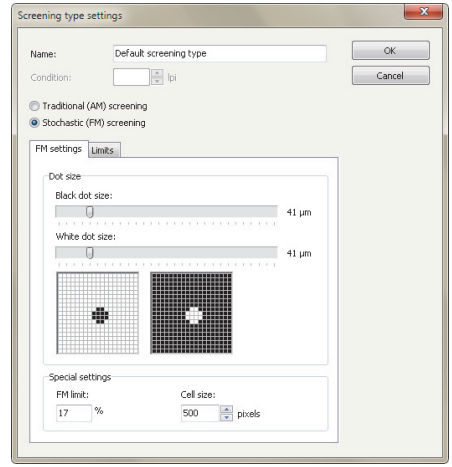
- **Hybrid transition limits (flexo option ON):** specify the minimum and maximum allowed size (in percents or microns) of the screen dots, as well as size of the dots at the other end of the AM-FM transition phase. As a result, the halftone will have the following phases:

  - Pure AM (e.g. 35–65%): the dot has a perfect grid structure, and acts like a traditional halftone dot.
  - AM-FM transition (e.g. 3-35% and 65-97%): as the dots get smaller (from 35% towards 3% and from 65% towards 97% in our example), they are slowly drifted towards a stochastic structure from the gridpoints, ending up (at 3% and 97% in this example) in a structure that looks almost perfectly stochastic. If the values are closer to the extremes (e.g. 30% instead of 35% or 70% instead of 65%), the structure reached at the end of the phase will be less stochastic. If the values are closer to 50% (e.g. 40% instead of 35% or 60% instead of 65%), the structure reached will be closer to a true stochastic structure. On the other hand, the visual impact of an AM-FM transition phase is worse than that of the pure AM phase, thus the need to keep it as small as possible. The default values are a good compromise between a relatively small transition phase and a relatively pleasant stochastic structure at the ends. See more in *9.5.6 Increased highlight quality for flexo ‹page 105›*.
  - Pure FM (e.g. 0–3% and 97–100%): instead of the dots getting any smaller than the specified limit, they are stochastically removed. If the starting point (e.g. 3% and 97%) has a true stochastic structure, this phase will act as a pure FM screen, having a pleasant, pattern-free look. This is why it is preferred by flexo operators: due to the huge dot gain of the flexo in highlights, it is very important for this phase to have the highest possible quality, even at the expense of a lower quality in the FM-AM phase.

- **Flexo optimized hybrid screening:** controls whether the FM-AM transition phase will become available or not.
- **Low-pass (gradient smoothener) filter width:** achieves better color accuracy at the expense of slightly noisier tints, generally improving the look of gradients. See more in *9.5.7 Low-pass filtering of the tonal jumps ‹page 106›*. If the slight size variation of halftone dots is not desired, it can be turned off (setting it to 0%). It may be further increased for suppressing the banding or patterning of the output device.
- **Dot centered rosette:** controls whether the C, M and K screens will form *dot centered* or *clear centered* rosettes. Small registration errors can cause color changes, these are less noticeable if clear centre rosettes are used. Dot centered rosette appear more pleasing to the eye.

9.7.2 FM settings tab

The FM settings tab defines the parameters of the stochastic (FM) screening. The following controls are available:



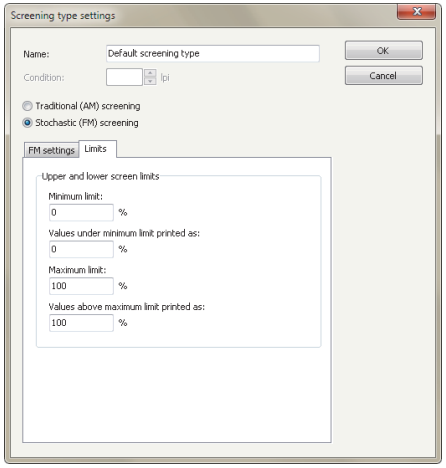
- **Black/white dot size:** specifies, in microns, the size of the dot size that will be used in the pure FM phase of the FM screening. The actual pixel structure of the dot is also displayed. Note that the sizes of the black and white dots can be different, see *9.6.6 Different black and white dot size ‹page 107›*.
- **FM limit:** specifies the end of the pure FM phase. From this limit on, no more dots will be added, but the sizes of the existing dots will be increased instead. The default value is 17%, which empirically seems to produce the most pleasant result.
- **Cell size:** specifies the size, in device pixels, of the supercell. Small supercells may cause a tiling effect, the human eye may recognize the repeating pattern of the stochastic screen. On the other hand, big super-

cells may cause bad screen generation performance (normally generating the four stochastic screens takes about one minute). The cell size of 500 pixels seems to be a good compromise.

9.7.3 Limits tab

Certain print technologies need the minimum or maximum screen percentage to be limited:

- It is common in the gravure industry to limit the maximum tint to 80–90%,
- It is common in the flexo industry to knocking out tints below 2%.



The goal of the screen limitations is to let the operator implement these limitations. The available settings are:

- **Minimum limit:** the minimum screen percentage that prints normally. Tints below the minimum limit will be printed as specified below.
- **Values under minimum limit printed as:** specify the percentage used for printing the tints below the *Minimum limit* value. This is typically either equal to the minimum limit (e.g. under 3% everything is printed as 3%), or equal to zero (e.g. under 3% is everything is printed as 0%).
- **Maximum limit:** the maximum screen percentage that prints normally. Tints above the minimum limit will be printed as specified below.
- **Values above maximum limit printed as:** specify the percentage used for printing the tints above the *Maximum limit* value. This is typically either equal to maximum limit (e.g. above 97% everything is printed as 97%), or equal to 100% (e.g. above 97% is everything is printed as 100%).

9.8 TEST SCREEN WINDOW

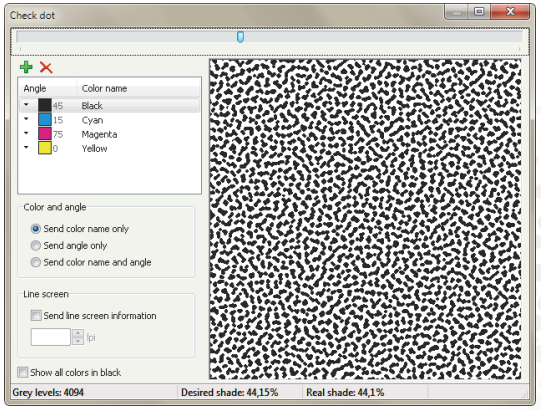
The *Test screen* window provides a visual interface for testing the screen settings of a job style. It can be accessed by pressing the *Test screen* button in the *Job style* dialog, see 6.2.9 Screening task ‹page 57›.

The goal is to test the reaction of the screening system as set up in the job style (including the effects of the screen rules, angle tables etc.) for the possible incoming values (whether and how the angle, screen frequency, plate name etc. are declared in the PostScript file). Note that while testing a screen that has not been generated before, it may take seconds or even minutes for the screens to be generated and displayed in the preview area.

By default, the tester is set up to test a typical PDF situation: only the color names and nothing else is declared (so the angles are looked up from the *Angle table,* and the default screen frequency, dot shape etc. will be used). It is possible though to simulate line screen and angle declarations too, as explained below.

The following controls are available:

- **Dot percentage:** will change the simulated percentage of the selected color(s). Each color has its own percentage, but they can also be



changed together by selecting multiple colors and then adjusting this control.

- **The list of the tested colors:** by default cyan, magenta, yellow and black.

  - New colors can be added with the *Add color* and *Delete color* buttons.
  - Selecting one or more colors will show the selected color(s) in the preview area (useful for testing rosette or moiré).
  - The color can be changed by clicking on the arrow to the left of the icon, and selecting the desired color from the ink list.
  - The angle can be changed by clicking on it, and typing it into the editor, which should appear in a second.

- **Color and angle:** specifies whether the color name, angle or both will be sent to the screening module.
- **Line screen:** specifies whether and what line screen information will be sent to the screening module. This is the way to test any extra screening types, conditioned by a given lpi value. This control will be automatically set if a screening type is selected in the *Job style* window prior to pressing the *Test screen* button.
- **Show all colors in black:** will modify the display of the preview area, showing all selected colors in black.

10 Proofing

Cascade has its own built-in proofing system. Acting from the inside of Cascade (rather than being an external application) it is able to proof jobs in various stages (processed, printed or archived) and views (composite or imposition) with one click. As the proofer appears in the Cascade system as another printer profile, printing a proof will be as simple as printing any other job in the Cascade system, assisted by the same media saving and previewing environment.

Cascade has implemented both widely used proofing models: its contone and raster (dot for dot) proofing modules allow users to choose the right solution for their specific needs.

10.1 BASIC CONCEPTS

10.1.1 What is digital proofing for?

The goal of proofing is to predict the output of a given printing technology (for example, offset) by printing a proof it on an inkjet or laser printer. Using the right color management techniques, the printed proof will have exactly the same (or at least similar, in case of content proofing) color as the final print; in case of halftone or raster proofers, even the halftone structure will be similar or exactly the same.

Proofs are used for:

- **Content proofing:** for spelling errors, layout problems etc. – these proofs are printed quickly, without paying too much attention to the image quality and color accuracy;
- **Color proofing:** predict almost perfectly the color of the output too, thus the term *contract proofing*. Printing these proofs may take time, printing an A3-sized high quality contract proof on an average inkjet printer may take 5-10 minutes.

10.1.2 Contone proofs

Contone proofers use the original PS/PDF file, process it with their internal PS/PDF interpreter, apply the right color management, and print it on the color printer as a continuous tone image.

Because the job will be interpreted twice, there is a slight chance of content differences (though in Cascade they will be interpreted by the same PS engine under the same conditions, so this chance is little more than theoretical).

Advantages:

- *Color accuracy:* the typical color accuracy is about ΔE = 1.
- *One profile needed:* the profiling work needs to be done just once, and then various ICC files can be simulated by one mouse click.

Disadvantages:

- *data integrity:* there is a slight theoretical chance for content differences between the proof and the print.
- *lower speed:* the file needs to be processed twice.
- *imposition:* only automatic impositions, that can be replicated in the proofing process, can be simulated.

The slightly confusing name of the contone proof leads to the common misconception they don't use screening techniques, but rather print contone images directly. Although the image of contone proofs look smooth and, on the good quality ones, there is no visible screening, under a lens or microscope the presence of the screening becomes obvious. However, the smoothest possible screening algorithms are used, so that on good quality proofs the output looks indeed contone to the naked eye.

When printing contone proofs, Cascade uses a different screening technique than normally: using an inkjet printer, it will take advantage of a special, inkjet optimized stochastic screening technique, enhanced by the use of light inks and the variable droplet size technology of many printer models.

10.1.3 Halftone proofs

Halftone proofers are hybrid contone-raster proofers: their working principle is similar to contone proofers, but their result is similar to raster proofs. Half-tone proofers use the original PS/PDF file, process it with their internal PS/PDF interpreter, apply the right color management, and print it on the color printer as a halftoned image, using a halftone structure that is as similar as possible to the target (simulated) halftone.

However, as quality halftone proofers simulate the ink colors of the target technology – not just the spot colors, but even the slightly different colors of the process inks (also called ink contamination) –, halftone proofers are more than just profiled halftone printers. Beyond the accurate simulation of halftone inks, Cascade's halftone proofing implementation succeeds in maintaining the full gamut of the proofer by controlling the ink contamination and, when needed, progressively removing it.

A major disadvantage of halftone proofing is that, although very similar to the target, its halftone structure may be visibly different: for example, a ma-genta halftone of a few percents may be added to pure cyan tints (in order to get accurate color on the proofer), while raster proofers (usually at the expense of a worse color accuracy) will keep the original halftone structure dot by dot, the color management taking effect through the ink color modulation.

Advantages:

- **Color accuracy:** the typical color accuracy is about ΔE = 1.
- **Fairly good halftone simulation:** although not keeping the original dot structure, the halftones are very similar and most differences are invisible to the naked eye.

Disadvantages:

- **data integrity:** there is a slight theoretical chance for content differences between the proof and the print.
- **lower speed:** the file needs to be processed twice.
- **imposition:** only automatic impositions, that can be replicated in the proofing process, can be simulated.

10.1.4 Raster proofs

Raster proofers take the already processed raster data, as it will be imaged on the imagesetter/CTP, simulating the in-rip imposition, halftone dots etc. on the proof.

Advantages:

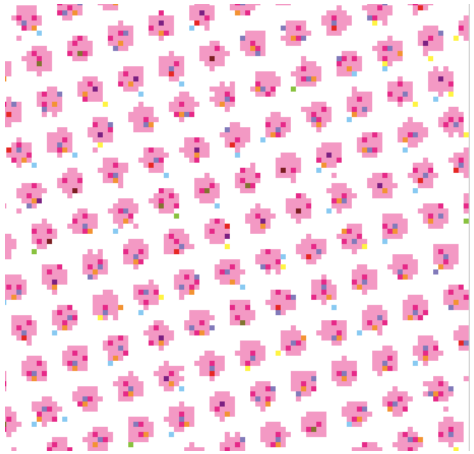
- *Guaranteed data integrity:* content differences between the proof and the print are impossible.
- *Halftone simulation:* the look of the proof will be more authentic; it also might help in detecting moirés.
- *Imposition simulation:* the user has the ability to simulate even manually made impositions.
- *Ease of use:* using the already ripped files, proofs can be created with one mouse-click.
- *Fast:* the job does not have to be processed twice.

Disadvantages:

- *Reduced color accuracy:* the typical color accuracy is about average ΔE = 2.5 (whereas contone proofing can achieve average ΔE < 1),
- *Several profiles needed:* the profiling operation needs to be done for each simulated ICC, as well as for every utilized line screen, calibration curve, etc.

It is a common misconception that the simulated C, M, Y and K halftones are made directly with the C, M, Y and K inks of the inkjet printer. In reality, things are much more complicated. The inkjet inks are usually more saturated (offering wider gamut), and simulating the offset inks will be achieved by blending the inkjet inks (in the case of the primaries, this is also called *ink contamination*).

The picture below shows a magenta halftone, simulated on a proofer. The basis of the halftone is the light magenta ink of the proofer, but the normal magenta ink is also used to make it darker (see the darker magenta pixels). Light cyan and yellow contamination pixels are also visible, making it less saturated, and obtaining the right color. The frequency of this screen is 170 lpi, resampled from 2400 dpi to 1440 dpi.



Moreover, using this technique, a raster proofer can simulate any inks used in the printing process, not just cyan, magenta, yellow or black. There is absolutely no difference between simulating an offset magenta or a Pantone 386 C, both offset inks will be a blend of the inkjet inks.

Another common misconception is that only large professional inkjet printers are able to print raster proofs; in reality, driven by Cascade, even small A3 desktop printers produce smooth halftones of 150-200 lpi.

The doubts are well founded: indeed an inkjet printer cannot print with the quality of an imagesetter, and inkjet printers working as imagesetters or platesetters are used only for less demanding applications (screen printing, newspaper industry, etc.), usually on low screen rulings or with stochastic screening. However, it would be the wrong conclusion to think that they are unable to produce prints that are *visually equivalent* to an offset print.

The trick is that while imagesetters must produce compact, sharp halftone dots (otherwise it could not be used by the printing press), the halftone dot on the proofer can be 'crumbled' – the human eye is unable to perceive that on the paper. An inkjet printer with a resolution of at least 1200×1200 dpi, used in conjunction with light inks, is able to produce a perfectly smooth halftone screen of up to 200 lpi, which the human eye can hardly distinguish from offset printing (although this halftone screen cannot be used for further processing, because microscopically the dots are 'crumbled' and have low density).

10.1.5 Comparison of proofing techniques

Below is a table with the advantages and disadvantages of the three proofing techniques:

	Contone	Halftone	raster
Color accuracy	**Excellent (average ΔE = 1)**	**Excellent (average ΔE = 1)**	Good (average ΔE = 2.5)
Halftone simulation	None	Good (fairly similar look)	**Excellent (dot for dot)**
Data integrity	Theoretical chance for errors	Theoretical chance for errors	**Errors are impossible**
Flexibility	**Profiled once**	Profiled for each target	Profiled for each target
Imposition simulation	Automatic impositions only	Automatic impositions only	**All imposition types**
Speed	Job ripped twice	Job ripped twice	**Job ripped once**

10.1.6 Color accuracy, ΔE

The most important quality factor of a proofer is the color accuracy, i.e. how close the colors of the proof are to the colors of the target print. As visual comparison is subjective and not always relevant, there are standardized methods of estimating the accuracy of the proofing systems.

These methods are based on the color difference formula called *delta*

E, which defines the difference between two colors measured with a spectrophotometer in the Lab color space. There are different delta E formulas, the one considered best is the CIE 2000 formula (as used by Cascade), as it gives the most uniform results (while older formulas sometimes give high values for visually indistinguishable colors). The interpretation of the delta E value is subjective, but a generally accepted interpretation is the following:

- < 1: a perfect match: the color differences are indistinguishable to the human eye.
- 1–3: an excellent match: the color differences are distinguishable only on large patches touching each other (i.e. without a gap). Patches separated by gaps are generally not distinguishable.
- 3–6: a good match: the color differences are clearly distinguishable on large, touching patches, but are generally difficult to distinguish on two different prints (e.g. the difference between the proof and the original print can be hard to spot).
- 6–10: an acceptable match: the color differences are clearly distinguishable even on different prints, but the difference is not disturbing.

When estimating the accuracy of a proofer, the average ΔE, maximum ΔE and maximum ΔE for primaries are taken in account.

10.2 SETTING UP THE PROOFING SYSTEM

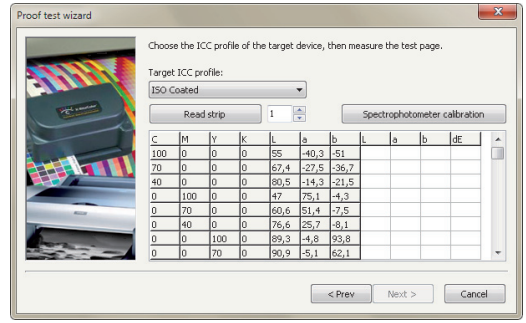
10.2.1 Spectrophotometer setup

It is impossible to set up the proofer without a spectrophotometer, therefore it is critical to have a spectrophotometer installed in the system. The spectrophotometer has to be connected to a PC that runs the Client application (rather than to the Server PC).

The spectrophotometer can be set up by the *Spectrophotometer setup* item in the *Proof* menu.

The following settings are available:

- **Spectrophotometer model:** in version 3.3, only X-Rite DTP-41 and Eye-One are available.
- **Communication port:** the port that the spectrophotometer is connected to. Grayed out if the connection is managed automatically.

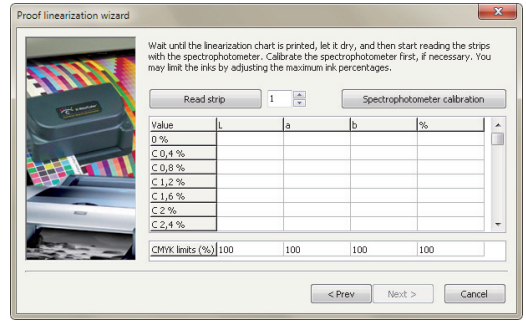


- **Patch height (scan direction):** as the profiling charts will be generated for the chosen spectrophotometer, the width and height of the generated patches are set up here (affecting measurement accuracy but also speed and print costs). This is the dimension of the patch in the scan direction.
- **Patch width:** the dimension of the patch that is perpendicular to the scan direction.

After setting up the parameters, click *Next*. The wizard will attempt to establish the communication between the Cascade and the spectrophotometer, and will report the result.

10.2.2 Proofer linearization wizard

The proofer uses a very fine stochastic screening for proofing, used both by the contone and raster modules. To achieve good color accuracy and moiré free output, the proofer must be linearized.


Proof linearization wizard
Wait until the linearization chart is printed, let it dry, and then start reading the strips with the spectrophotometer. Calibrate the spectrophotometer first, if necessary. You may limit the inks by adjusting the maximum ink percentages.
Read strip
Spectrophotometer calibration
CMYK limits (%)
< Prev
Next >
Cancel

The *Proof linearization wizard* can be launched from the *Proof* menu. The following steps need to be performed:

- Choose the **printer profile** that needs to be linearized. At this point a native color printer profile is needed (i.e. not a proof profile, and not a monochrome printer profile). It is important to choose the profile with the required resolution: for high quality proofs the recommendation is to choose the highest possible resolution (typically 1440 or 1200 dpi). For fast content proofing the recommendation is to choose lower resolution (720 or 600 dpi).After clicking *Next,* a proof chart will be printed. Wait for the printer to finish.
- Check the print for ink flow problems. If the 100% patches are wet, then almost certainly there will be ink flow problems on mixed color (where a higher quantity of ink needs to be absorbed).
- Let the print dry (colors will stabilize).
- Calibrate the spectrophotometer by clicking the **Spectrophotometer calibration** button.
- Start reading the printed chart row by row (normally using only the buttons on the spectrophotometers, no interaction is needed on the PC). After a successful read, the row index parameter will be incremented; otherwise an error message will appear. In the case of a reading error, a row can be re-read by adjusting the row index before the read.
- After the last row is read, the *Next* button will become active.
- If this is a re-linearization due to ink flow problems during the profiling process, the ink quantity needs to be limited by choosing lighter patches as the darkest possible color for each of the 4 inks. For example, you may decide that the 90% C patch is dark and saturated enough to provide the needed gamut, but light enough to avoid ink flow problems. As a rule of thumb, the selected C, M, Y and K patches should be a bit darker than the 100% patches of the target technology (e.g. offset).
- If ink limitation is necessary, type the percentages of the identified patches to **CMYK limits** table (the first value being the C limit, the second the M limit, and so on). The easiest way to identify the percentage of a patch is to count it back from 100% on the chart, and then in the table (e.g. the 5th patch from 100% is 92.5%).
- Click *Next*. The results will be saved automatically into the chosen profile. The name of the linearization curve will also contain a time stamp.
- Check the **Verify linearization** button to verify the results (recommended only if there are doubts about the process, normally it is not necessary), measure the printed chart, and compare the printed and measured percentages. Redo the linearization if the results are inconsistent.

10.2.3 Contone proof wizard

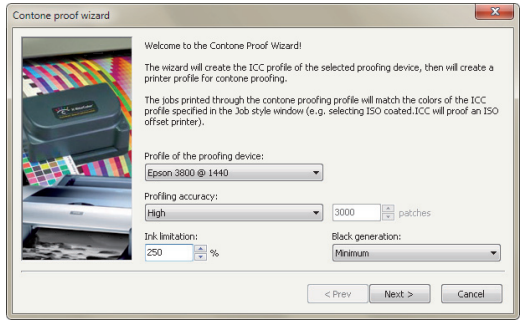
This wizard will profile the proofer, generating an ICC file that will describe the printer using Cascade's contone proofing screening technology, the given paper, resolution, ink and printer settings. The result will be a new proof profile (a printer profile with the *Proof profile* option checked) that will contain the linearization and ICC profiles, and will be ready for printing contone proofs.

It is strongly recommended that the contone proof wizard is run even if only raster proofs will be printed, as it will greatly improve the spot color accuracy.

The *Contone proof wizard* can be launched from the *Proof* menu. The following steps have to be performed:

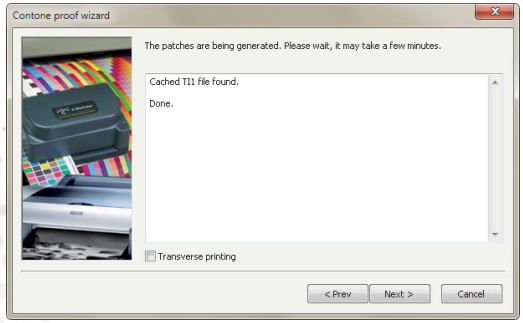
- Choose the **profile of the proofing device:** this must be a native color printer profile (i.e. not a proof profile, and not a monochrome printer profile), which has been previously linearized (see *10.2.2 Proofer linearization wizard ‹page 114›*). If there is no such profile, the wizard will fail.
- Set the **profiling accuracy** parameter, which controls the number of patches printed for the profiling. The default value is 3000 (for high quality profiles), but good quality profiles can be obtained with 2000 or even less patches.
- Set the **ink limitation** parameter. This controls the maximum quantity of ink that the proofer is allowed to print (e.g. 250% means that, for example, C: 100, M: 100, Y: 50 is allowed, but C: 100, M: 100, Y: 60 is not). Generally 250% is enough to cover the whole gamut, with the right use of the black ink. Higher values may improve the gamut, but may also cause ink flow problems. Lower values may cure ink flow problems, but also limit the gamut (the lowest theoretical value with no gamut limitation is 200%).
- Choose the **black generation** value (i.e. the balance of CMY and K inks for printing gray components of colors). This value is automatically chosen based on the available light inks on the printer:
  - recommended setting for printers with LK and LLK inks is the highest possible black generation value *(Maximum),* as even the lightest grays are smoothly printed without CMY inks;
  - recommended setting for printers with LK ink is *Medium* black generation, as in highlights the use of CMYK will still produce smoother results;

- recommended setting for printers without light black inks is *Minimum* value, as using black ink only will produce grainy tints in highlights and midtones.

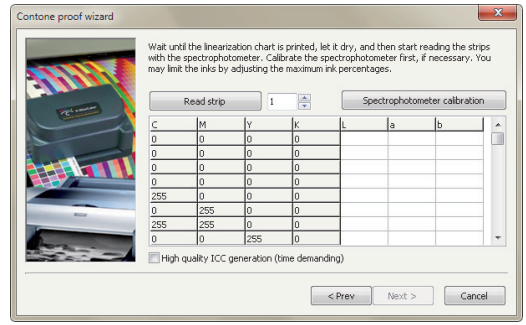

Contone proof wizard
Welcome to the Contone Proof Wizard!
The wizard will create the ICC profile of the selected proofing device, then will create a printer profile for contone proofing.
The jobs printed through the contone proofing profile will match the colors of the ICC profile specified in the Job style window (e.g. selecting ISO coated.ICC will proof an ISO offset printer).
Profile of the proofing device:
Epson 3800 @ 1440
Profiling accuracy:
High
3000
patches
Ink limitation:
250
%
Black generation:
Minimum
< Prev
Next >
Cancel

If color accuracy is the main consideration, and the graininess of the tints is less important, use maximum black generation even for printers without light black inks: the color stability will be considerably better.

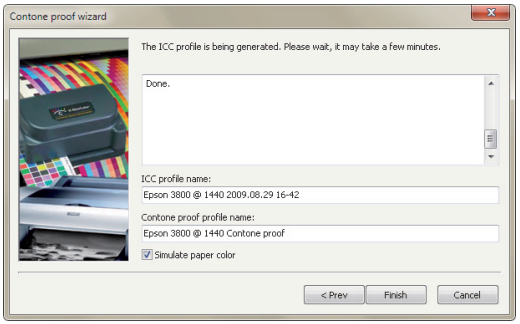
- Click *Next*. Wait until the patch list used in the color chart is generated (the results are cached, so for the same values the patch generation will be skipped next time).
- On sheet fed printers you may choose **Transverse printing.** With this option turned on, the rows will be printed along the length of the paper rather than across the width (resulting in less rows and therefore faster reading).


Contone proof wizard
The patches are being generated. Please wait, it may take a few minutes.
Cached TI1 file found.
Done.
Transverse printing
< Prev
Next >
Cancel

- Click *Next*. The profiling chart (consisting of one or more pages) will be printed.
- Let the print dry (colors will stabilize). Taking into account the accuracy needed at this phase, the recommendation is to wait at least 10 minutes.
- Calibrate the spectrophotometer by clicking the **Spectrophotometer calibration** button.
- Start reading the printed chart row by row (normally using only the buttons on the spectrophotometers, no interaction is needed on the PC). After a successful read, the row index parameter will be incremented; otherwise an error message will appear. In the case of a reading error, a row can be re-read by decrementing the row index before the read.
- After the last row is read, the *Next* button will become active.
- Turning on the **High quality profile** option will cause a substantially slower ICC generation process (roughly 20-40 minutes instead 1-2 minutes), but if the highest possible accuracy is required, you may want to check it.

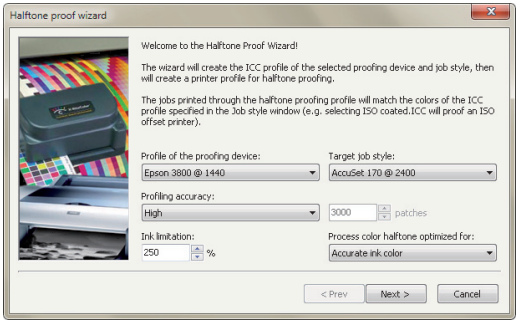

Contone proof wizard
Wait until the linearization chart is printed, let it dry, and then start reading the strips with the spectrophotometer. Calibrate the spectrophotometer first, if necessary. You may limit the inks by adjusting the maximum ink percentages.
Read strip
1
Spectrophotometer calibration
C M Y K L a b
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0
255 0 0 0
0 255 0 0
255 255 0 0
0 0 255 0
High quality ICC generation (time demanding)
< Prev
Next >
Cancel

- Click *Next*. The profile will be generated (according to the setting above, it will take 1-40 minutes). The *Next* button will become active when the ICC profile generation process is done.
- You may change the **ICC profile name,** as it will appear in the *Color profiles* list.
- Choose the **Contone proof profile name,** as it will appear in the *Printer profiles* list.
- The **Simulate paper color** specifies whether the proof should simulate the color of the target paper (typically printing a yellowish tint on the bright white proofing paper in order to match the color of the offset paper). Unchecking this option is not a correct procedure, as the proof will still remain absolute (possibly resulting in visible white spots in light areas – the light colors will still have the paper color counted in), but many users prefer it.


Contone proof wizard
The ICC profile is being generated. Please wait, it may take a few minutes.
Done.
ICC profile name:
Epson 3800 @ 1440 2009.08.29 16-42
Contone proof profile name:
Epson 3800 @ 1440 Contone proof
Simulate paper color
< Prev
Finish
Cancel

- Clicking the *Finish* button, the proof profile will be created, ready to print contone proofs.
- You may create a job style for printing proofs, see *10.3.2 Proof job styles ‹page 122›*.

10.2.4 Halftone proof wizard


Halftone proof wizard
Welcome to the Halftone Proof Wizard!
The wizard will create the ICC profile of the selected proofing device and job style, then will create a printer profile for halftone proofing.
The jobs printed through the halftone proofing profile will match the colors of the ICC profile specified in the Job style window (e.g. selecting ISO coated.ICC will proof an ISO offset printer).
Profile of the proofing device:
Epson 3800 @ 1440
Target job style:
AccuSet 170 @ 2400
Profiling accuracy:
High
3000
patches
Ink limitation:
250
%
Process color halftone optimized for:
Accurate ink color
< Prev
Next >
Cancel

This wizard will profile the proofer in halftone mode for a given target job style, generating an ICC file that will describe the printer using the screening technology of the target job style on the given paper, resolution, ink and printer settings. The result will be a new proof profile (a printer profile with the *Proof profile* option checked) that will contain the linearization, the contone and halftone ICC profiles and the target job style, and will be ready for printing halftone proofs.

Halftone proof profiles are less flexible than contone proof profiles (as they can be used only for the job styles they have been profiled for), but more flexible than raster proof profiles (as the calibration of the target job style will not affect color accuracy).

A different halftone proof profile is necessary for each simulated job style. For each new job style, or if any of the settings of a profiled job style is changed (ICC or screen settings), a new profiling procedure is necessary, otherwise color accuracy isn't guaranteed.

The *Halftone proof wizard* can be launched from the *Proof* menu. The following steps have to be performed:

- Choose the **profile of the proofing device:** this must be a native color printer profile (i.e. not a proof profile, and not a monochrome printer profile), which has been previously linearized (see *10.2.2 Proofer linearization wizard ‹page 114›*) and contone profiled (see *10.2.3 Contone proof wizard ‹page 115›*). If there is no such profile, the wizard will fail.
- Select the target job style**:** this will specify the simulated ICC profile and the screening parameters that the halftone proof will simulate (e.g. ISO Fogra 27, 150 lpi, Euclidean, etc.).
- Set the **profiling accuracy** parameter, which controls the number of patches printed for the profiling. The default value is 3000 (for high quality profiles), but good quality profiles can be obtained with 2000 or even less patches.
- Set the **ink limitation** parameter. This controls the maximum quantity of ink that the proofer is allowed to print (e.g. 250% means that, for example, C: 100, M: 100, Y: 50 is allowed, but C: 100, M: 100, Y: 60 is not). Generally 250% is enough to cover the whole gamut, with the right use of the black ink. Higher values may improve the gamut, but may also cause ink flow problems. Lower values may cure ink flow problems, but also limit the gamut (the lowest theoretical value with no gamut limitation is 200%).
- Set the **Process color halftone optimized for** parameter: as Cascade simulates all inks of the target (e.g. offset) technology – not just the spot colors, but also the cyan, magenta, yellow and black inks –, the simulated process color inks are blended from the proofer inks (e.g. a typical offset cyan is blended from 85% proofer cyan + 15% proofer magenta + 5% proofer yellow), which may result in somewhat blurry halftones. This setting lets the operator turn off or limit the ink blending for process colors (e.g. the cyan halftone being printed with 100% proofer cyan ink), resulting in sharper halftones. Although the color accuracy of the proof is not affected by this setting (the ICC profile will be generated accordingly), there are pros and cons to using sharp dots:

- *Advantages:* sharper, more realistic halftones and rosettes; independence from the target ICC profile (changing the target ICC profile will not imply re-profiling);
- *Disadvantages:* the halftone structure may be visibly different on certain colors (e.g. pure cyan tints will have magenta halftones); the different color of the ink may become visible on low line screens

- Click *Next*. Wait until the patch list used in the color chart is generated (the results are cached, so for the same values the patch generation will be skipped next time).
- On sheet fed printers you may choose **Transverse printing.** With this option turned on, the rows will be printed along the length of the paper rather than across the width (resulting in less rows and therefore faster reading).
- Click *Next*. The profiling chart (consisting of one or more pages) will be printed.
- Let the print dry (colors will stabilize). Taking into account the accuracy needed at this phase, the recommendation is to wait at least 10 minutes.
- Calibrate the spectrophotometer by clicking the **Spectrophotometer calibration** button.
- Start reading the printed chart row by row (normally using only the buttons on the spectrophotometers, no interaction is needed on the PC). After a successful read, the row index parameter will be incremented; otherwise an error message will appear. In the case of a reading error, a row can be re-read by decrementing the row index before the read.
- After the last row is read, the *Next* button will become active.
- Turning on the **High quality profile** option will cause a substantially slower ICC generation process (roughly 20-40 minutes instead 1-2 minutes), but if the highest possible accuracy is required, you may want to check it.
- Click *Next*. The profile will be generated (according to the setting above, it will take 1-40 minutes). The *Next* button will become active when the ICC profile generation process is done.
- You may change the **ICC profile name,** as it will appear in the *Color profiles* list.
- Choose the **Contone proof profile name,** as it will appear in the *Printer profiles* list.
- The **Simulate paper color** specifies whether the proof should simulate the color of the target paper (typically printing a yellowish tint on the bright white proofing paper in order to match the color of the offset paper). Unchecking this option is not recommended, as the proof will still remain absolute (possibly resulting in visible white spots in light areas – the light colors will still have the paper color counted in), but many users prefer it.
- Clicking the *Finish* button, the proof profile will be created, ready to print contone proofs.
- You may want to create a job style for printing proofs, see *10.3.2 Proof job styles ‹page 122›*

10.2.5 Raster proof wizard

This wizard will create a raster proof profile that will simulate the results of the selected job style. Unlike the contone proof wizard, which profiles the proofer itself, without taking into account the target ICC (or, generally, the simulated printing conditions) during the profiling process, the raster proof wizard will be done only for the given printing conditions, as they are specified in the selected job style.

A different raster proof profile is necessary for each simulated job style. For each new job style, or if any of the settings of a profiled job style is changed (ICC, screen or calibration settings), a new profiling procedure is necessary, otherwise color accuracy isn't guaranteed.

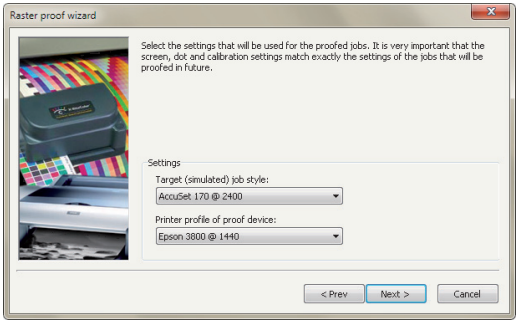
Although creating a raster proof profile is possible without the contone profiling being done (i.e. an ICC profile being done for the given printer profile), for better spot color accuracy it is strongly recommended that a contone profiling (see *10.2.3 Contone proof wizard ‹page 115›*) is done before running the *Raster proof wizard*.

The *Raster proof wizard* can be launched from the *Proof* menu. The following steps have to be performed:

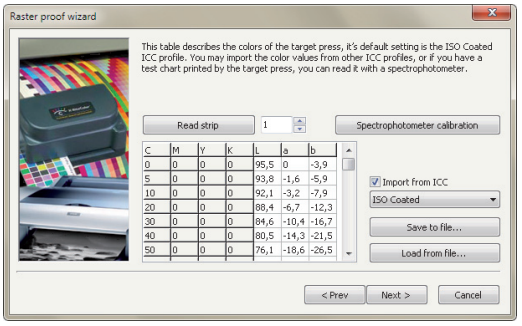
- A table containing the measurements of 78 patches printed with the target printing conditions must be filled. There are two choices:
  - Choose the ICC profile to simulate, selecting the **Import from ICC** box and choosing an ICC profile from the list. This is recommended if there is an ICC profile for the given printing technology (typically offset).
  - Measure a previously printed target chart which can be found in the *Proof charts* folder of the installation CD. This is recommended if no ICC profile can be found for the given technology (e.g. silk printing). Example: to profile a silk screen printing technology line, print the

target chart suitable for the installed spectrophotometer (to save costs, together with a real job, as it's a small, 34×2 cm strip), by silk screen printing, then uncheck the **Import from ICC** box, and read the printed strip with the spectrophotometer. The results can be saved with the **Save to file** button, and can be read back with the **Load from file** button.

- Click *Next*, and choose the **target (simulated) job style.** This is the job style that is used for the target technology (e.g. silk printing, as in the example above). The screen settings, calibration files etc. used during the profiling process will be extracted from the specified job style. Double check that no further changes will be made on the job style, as any change (e.g. changing the calibration curves) will result in color inaccuracy.
- Choose the **printer profile of the proof device.** This must be a native color printer profile (i.e. not a proof profile, and not a monochrome printer profile), which has been previously linearized (see *10.2.2 Proofer linearization wizard ‹page 114›*), and preferably also contone profiled (see *10.2.3 Contone proof wizard ‹page 115›*). If there is no such profile, the wizard will fail.

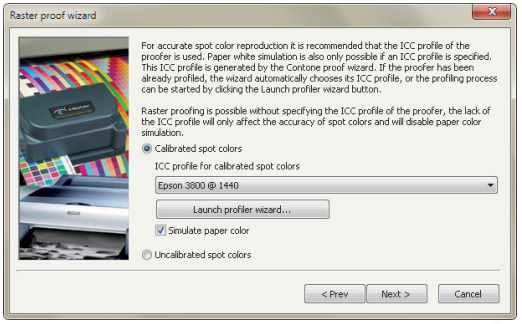

Raster proof wizard
Select the settings that will be used for the proofed jobs. It is very important that the screen, dot and calibration settings match exactly the settings of the jobs that will be proofed in future.
Settings
Target (simulated) job style:
AccuSet 170 @ 2400
Printer profile of proof device:
Epson 3800 @ 1440
< Prev
Next >
Cancel

- Click *Next*, and choose whether the spot colors will be calibrated (i.e. a contone ICC profile will be used for their accurate reproduction):
  - Selecting the **Calibrated spot colors** option an ICC profile can be specified in the **ICC profile for calibrated spot colors** drop-down list. This must be the result of a previously performed contone profile wizard. If the chosen printer profile has already been contone profiled, this option will be automatically selected (the ICC profile will be automatically chosen too), otherwise the contone profiling can be done at this phase by clicking the **Launch profiler wizard** button.


Raster proof wizard
This table describes the colors of the target press, it's default setting is the ISO Coated ICC profile. You may import the color values from other ICC profiles, or if you have a test chart printed by the target press, you can read it with a spectrophotometer.
Read strip
Spectrophotometer calibration
C M Y K L a b
0 0 0 0 95,5 0 -3,9
5 0 0 0 93,8 -1,6 -5,9
10 0 0 0 92,1 -3,2 -7,9
20 0 0 0 88,4 -6,7 -12,3
30 0 0 0 84,6 -10,4 -16,7
40 0 0 0 80,5 -14,3 -21,5
50 0 0 0 76,1 -18,6 -26,5
Import from ICC
ISO Coated
Save to file...
Load from file...
< Prev
Next >
Cancel

  - selecting the **Uncalibrated spot colors** option is recommended only if spot color accuracy is not critical, as a less accurate approximation algorithm will be used.

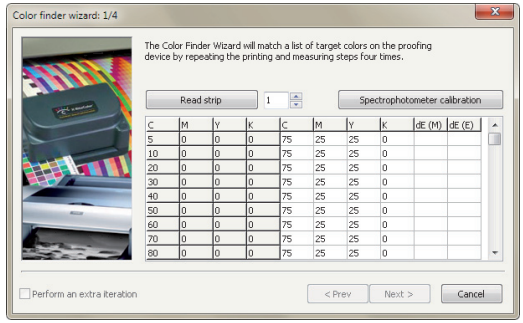
- The **Simulate paper color** option will specify whether the paper white of the target technology will be simulated (typically printing a yellowish tint on the bright white proofing paper). Paper color simulation is only possible if the proofer is contone profiled.


Raster proof wizard
For accurate spot color reproduction it is recommended that the ICC profile of the proofer is used. Paper white simulation is also only possible if an ICC profile is specified. This ICC profile is generated by the Contone proof wizard. If the proofer has been already profiled, the wizard automatically chooses its ICC profile, or the profiling process can be started by clicking the Launch profiler wizard button.
Raster proofing is possible without specifying the ICC profile of the proofer, the lack of the ICC profile will only affect the accuracy of spot colors and will disable paper color simulation.
Calibrated spot colors
ICC profile for calibrated spot colors
Epson 3800 @ 1440
Launch profiler wizard...
Simulate paper color
Uncalibrated spot colors
< Prev
Next >
Cancel

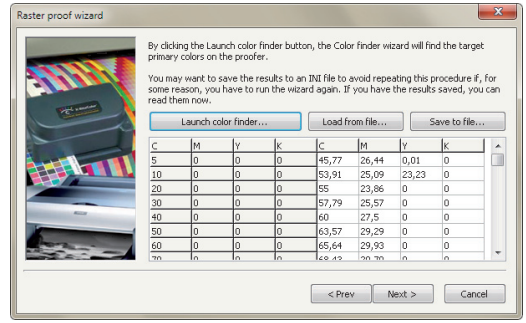
- Click *Next*. A table will appear which will contain the amount of proofer inks for achieving various percentages of the primary colors (i.e. cyan, magenta, yellow and black) of the target device. Normally this will be done by the **Launch color finder** button, but the results of previously performed color finder wizards can be loaded by the **Load from file** button.
- The *Color finder wizard* will find the best approximations of the request-

ed colors by printing and measuring charts consecutively (by default 4 print and measure cycles), the latitude for error of each color being incrementally reduced by the consecutive prints. Perform the following steps:

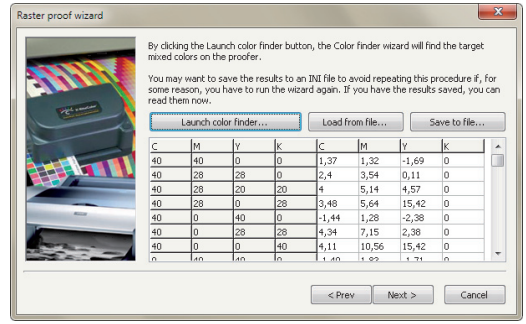
- At the first step, calibrate the spectrophotometer clicking on the **Calibrate spectrophotometer** button;
- Wait for the chart to be printed, and let it dry;
- Measure the chart with the spectrophotometer;
- The last two columns will show the best measured ΔE results (M), as well as the best expected ΔE results (E) for the next cycle;
- Click *Next*, and do the next cycle;
- After the first 4 obligatory cycles, further cycles can be made by checking the **Perform an extra iteration** box. It is worth performing further iterations if there are colors with high measured ΔE values (it is desirable to have ΔE < 1 for most values, and no values with ΔE > 3), and at the same time the expected values for the next cycle are considerably smaller (otherwise it is perhaps a gamut limitation).


Color finder wizard: 1/4
The Color Finder Wizard will match a list of target colors on the proofing device by repeating the printing and measuring steps four times.
Read strip
Spectrophotometer calibration
Perform an extra iteration
< Prev
Next >
Cancel

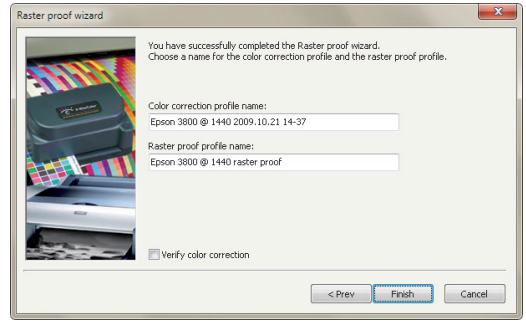
- Clicking *Finish*, the *Color finder wizard* will return and the table will be filled with the primary color values found. It is strongly recommended that these values are saved with the **Save to file** button, so that these partial results can be re-used later.
- Click *Next*. A table will appear which will contain the amount of proofer inks for achieving various mixed colors of the target device. The procedure is exactly the same as for the primary colors: the *Color finder wizard* has to be started (printing and measuring another 4 charts), so in total 8 charts will have to be printed and measured in the raster profiling process. Again, it is recommended that the partial results are saved.
- Having both the primary and mixed colors found, the profiling is done.


Raster proof wizard
By clicking the Launch color finder button, the Color finder wizard will find the target primary colors on the proofer.
You may want to save the results to an INI file to avoid repeating this procedure if, for some reason, you have to run the wizard again. If you have the results saved, you can read them now.
Launch color finder...
Load from file...
Save to file...
< Prev
Next >
Cancel

Click *Next*, and fill the **color correction profile name** (as it will appear in the *Color correction profile* setting of the printer profiles), and the **raster proof profile name** (as it will appear in the *Printer profiles* list).


Raster proof wizard
By clicking the Launch color finder button, the Color finder wizard will find the target mixed colors on the proofer.
You may want to save the results to an INI file to avoid repeating this procedure if, for some reason, you have to run the wizard again. If you have the results saved, you can read them now.
Launch color finder...
Load from file...
Save to file...
< Prev
Next >
Cancel

- Check the **Verify color correction** box for verifying the results (recommended only if there are doubts about the process, normally it is not necessary), and measure the printed chart. The ΔE values of the primary and mixed colors will be displayed. They should be similar to the values seen in the last step of the *Color finder wizard*.


Raster proof wizard
You have successfully completed the Raster proof wizard.
Choose a name for the color correction profile and the raster proof profile.
Color correction profile name:
Epson 3800 @ 1440 2009.10.21 14-37
Raster proof profile name:
Epson 3800 @ 1440 raster proof
Verify color correction
< Prev
Finish
Cancel

- Clicking *Finish* the raster proof profile will be created, ready for printing raster proofs.

10.2.6 Test proof wizard

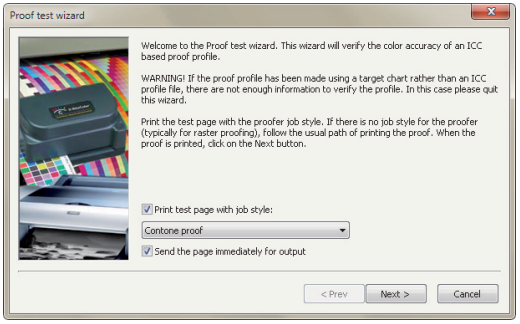
It is strongly recommended that the test proof wizard is run after either proof wizards (contone, halftone or raster). This will test the proof in normal working conditions (i.e. printing the proof as a regular PDF job rather than an internal test), so having good results in this wizard will guarantee that the proofer is accurate.

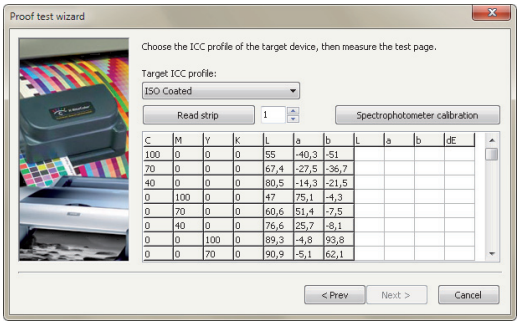
The test proof wizard works only for ICC based proof profiles, so raster proofs based on measuring the Target chart cannot be tested.

The working principle of the wizard is that it prints a chart containing CMYK patches, and compares the printed and measured patches with the values specified by the ICC profile (i.e. whether the measured Lab value of a given CMYK patch matches the Lab value provided by the ICC profile).

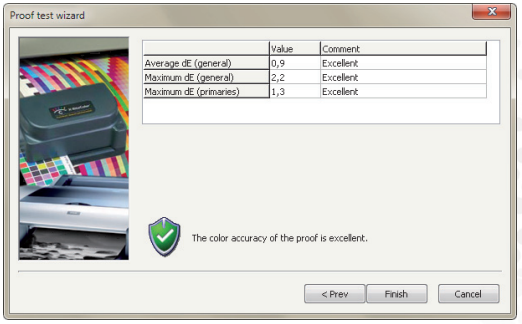
The *Test proof wizard* can be launched from the *Proof* menu. The following steps have to be performed:

- Check the **Print test page with job style** box if there is a job style created for printing proofs (see more in *10.3.2 Proof job styles ‹page 122›*), and choose the given job style. Alternatively, print the *Proof test* PDF file (suitable for the installed densitometer) from the Cascade program folder, following the normal path of printing proofs (see *10.3 Printing proofs ‹page 122›*). Check the **Send the page immediately for output** box if the proofed job does not need confirmation (e.g. for checking the positioning on the media).
- Click *Next*. If the **Print test page with job style** box was checked, the test chart will be printed now. Wait for the printer to finish, and let the print dry.
- If a job style was used, the **Target ICC profile** box will be automatically set to the ICC profile used by the job style. Otherwise, the target ICC profile should be manually selected.
- Calibrate the densitometer by clicking on the **Calibrate densitometer** function.
- Read the test chart. The measured ΔE values will be displayed for each patch.


Proof test wizard
Welcome to the Proof test wizard. This wizard will verify the color accuracy of an ICC based proof profile.
WARNING! If the proof profile has been made using a target chart rather than an ICC profile file, there are not enough information to verify the profile. In this case please quit this wizard.
Print the test page with the proofer job style. If there is no job style for the proofer (typically for raster proofing), follow the usual path of printing the proof. When the proof is printed, click on the Next button.
Print test page with job style:
Contone proof
Send the page immediately for output
< Prev
Next >
Cancel



- Click *Next*. The evaluation of the test will be displayed, as follows:
  - *Average ΔE (general):* the average of all ΔE values;
  - *Maximum ΔE (general):* the maximum ΔE value;
  - *Maximum ΔE (primaries):* the maximum ΔE value of the primary colors (i.e. all tints of C, M, Y and K);
- The results of the evaluation will also be displayed in common terms (*excellent, good, acceptable* or *out of tolerance*).



- The worst of the three results will be displayed as the general result of the test.

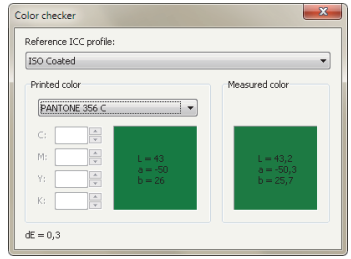
Using a decent quality printer and paper (with no gamut problems) Cascade proof test results should be at least *good,* but usually *excellent* (especially for contone proofs, which are more accurate). In cases of worse results the possible problems need to be investigated.

10.2.7 Color checker

While the Test proof wizard offers a generic evaluation of the proof accuracy, the color checker wizard can evaluate the accuracy of a given color, either on the proof or on the target print (e.g. offset) against an ICC profile.

This tool is especially useful in cases of color differences between the proof and the target print (e.g. a blue background is greenish on the proof and reddish on the target print), as the operator can check both colors against the reference ICC profile, finding out which of the colors was closer to the reference. To use the color checker, follow the steps below:

- Open the color checker from the Proof menu.
- Set up the Reference ICC profile (e.g. ISO Coated for offset).
- Set up the reference color:
  - for spot colors, choose them from the list (if not listed, define them in the Ink manager, see *6.6 Ink manager ‹page 67›*);
  - for process colors, specify the CMYK values.
- Point the spectrophotometer on the target print or proof over a compact area of the given color, large enough for a measurement (on a DTP-41 a larger area may be needed because it's difficult to align a given area under the sensor), and measure it.
- The difference between the reference and the measured color will be displayed in terms of ΔE (see *10.1.6 Color accuracy, ΔE ‹page 113›*).



There are three ways to print a proof in Cascade:

- Using the *Proofing* task of a job style;
- Opening a job with a proof job style;
- Using the *Print proof* command of the *Proof* menu (for raster proofs only).

10.3.1 The proofing task

The easiest way to proof a job is to check the *Proof* task, and set up the proofing parameters (see more in *6.2.11 Proofing task ‹page 59›*). This method can be used if the proof is printed *together* with the original job (e.g. the offset plates and the proofs are printed together).

This method isn't suitable for printing a proof only, without the original job.

This method will act in slightly different ways for contone/halftone and raster proofs:

- **Contone/halftone proofs:** a second job, with the same parameters as the original one (including imposition), will be opened in the specified contone/halftone proof profile. The proof job will start to process after the original one is finished.
- **Raster proofs:** a second job will be created in the specified raster proof profile as soon as the job is checked (i.e. sent to the *Print manager* or the TIFF catcher). If you change your mind, and don't need the proof, open the *Job information* of the job, and in the *Workflow* task uncheck the *Print raster proof* option.

10.3.2 Proof job styles

It is possible to create job styles for proofing, so jobs opened with the given job style will print only proofs, without printing to the target device (imagesetter, CTP). To create a proof profile, do the following (the operation is the same for all proof types):

- In the *Job styles* docker, select the target job style (i.e. the one used for printing to the imagesetter, CTP etc.).

- Create a copy of it with the *Create copy* button.
- Open the newly created copy, and give it a name (e.g. *Offset 170 lpi proof*).
- In the *Interpretation* task, select the proof profile to be used in the *Printer profile* drop-down box.
- Uncheck the *Proofing* task (we don't need a proof of the proof).
- In case of contone proofing, uncheck the *Calibration* task.

From this moment on, jobs opened with this job style will print proofs directly.

10.3.3 Print proof command

The *Print proof* command works only for raster proofing, and only if a processed job is selected (otherwise the menu item will be grayed out). Its functionality is described in 5.4.3 *Proofing* ‹page 40›.

10.3.4 Target ICC for contone

Contone proof profiles have information only about the proofer itself, but not about the simulated proofing conditions. The target ICC profile of the contone proofing must be specified separately, independently from the profiling process. The most important advantage of this being that the target ICC profile can be specified or changed with one click.

As logically the separation profile (used for converting the RGB colors into CMYK) is the same as the target profile (i.e. if the *ISO Coated* profile is used to convert RGB to CMYK, then obviously the same *ISO Coated* will determine how the CMYK colors in the job have to be interpreted), Cascade uses the *Separation profile* field of the job style as target ICC (see *6.2.6 Separations task* ‹page 54›).

It is critical to set up the *Separation profile* of the job style properly, if contone proofs will be printed with it.

10.3.5 Photo printing

A special case use of contone proofing is to use it without color management: instead of simulating a target ICC, the incoming CMYK values will be passed directly to the printer driver, and the incoming RGB values will be converted directly to the CMYK color space of the printer.

For this, the separations/target color space should be set to the ICC profile of the printer (see *6.2.6 Separations task* ‹page 54›):

- open the contone proof profile,
- look for the name of the *Proofer ICC profile* (*Proof* tab),
- open the job style,
- choose the ICC profile of the proofer in the *Separation profile* box (*Separations* task).
- open the *Color Profiles* folder in the Cascade data folder (on Vista the default location will be *C:\ProgramData\Cascade\Color profiles*), you will find the ICC profile of the proofer;
- install the ICC profile of the proofer into the DTP applications you intend to use as the printer/press profile.

From this moment on, files printed through this setup will use the maximum gamut of the printer, and will print accurate colors.

Note that colors defined as CMYK might be very different from the generic offset CMYK colors.

10.4 ADJUSTING THE SPEED AND QUALITY

With very few exceptions, modern inkjet printers, that are A3 or wider, are able to print good quality contone and raster proofs. The major quality issues are:

- **Speed:** printing an A3 proof might take between 5 and 30 minutes; the printing speed is often adjustable at the expense of the quality.
- **Halftone quality:** mechanical inaccuracies often cause grainy halftones or moiré. The accuracy of the head and paper movement has therefore a huge impact on the halftone quality.
- **Color gamut:** the colors of the printer inks heavily influence the color accuracy of the output. Certain printers are unable to reproduce the offset inks accurately, and therefore the proofs will have bad color accuracy.
- **Light inks:** the light versions of the CMYK inks (typically cyan and magenta, but ideally black too) always improve the quality, producing smoother halftones and compact halftone dots. Printers designed for printing large drawings quickly (e.g. architecture), without light inks, might be unable to print smooth halftones.
- **Ink consumption:** certain printers are able to print smooth halftones without using light inks. On these printers, disabling the use of light

inks will cause much smaller ink consumption, at the expense of a minor quality loss.

On certain printers (such as the Epson inkjets) many of the above parameters are adjustable, affecting the quality, speed and ink consumption of the prints. The following chapters will explain the technical problems and the Cascade solutions for them.

10.4.1 Light inks

Most inkjet printers used for proofing have light inks (at least light cyan and light magenta, but usually also light black) for a smoother output. As light shades can also be simulated using only the dark inks, the RIP has the freedom to choose the amount of the light inks used. Using more light inks will usually improve the quality, but will increase the costs of the print (as about 3 times more light ink is needed to print the same shade as with a dark ink).

The light ink usage can be controlled in the *Printer profile properties* dialog box (see *6.1.2 Printer profile properties dialog box ‹page 46›*) using the **Maximum light ink coverage** control, which specifies the maximum permitted coverage (density) of the light inks. Increasing this value to 100% will improve quality, but may cause ink flow problems (as the paper may not support too much ink). The default value of 70% will, on most inkjet printers, avoid ink flow problems.

Light inks are useful not just for avoiding visible droplets in highlights, but also have an important role in suppressing the mechanical inaccuracies of the printer. Banding, grainy tints or moiré can be partially or completely removed by the use of light inks. On most printer models high speed modes produce good quality only with extensive use of light inks.

Using light inks, the Cascade proofing module will also produce more compact halftone dots (less 'crumbled' than the ones made purely from dark inks).

Therefore using the default levels of Cascade is recommended. However, on low line screen rulings, or in less demanding conditions, using less light inks might produce the required result with much lower printing costs. Also, ink flow problems can be avoided by decreasing these values.

10.4.2 Banding

Certain printer models (such as Epson) allow Cascade to adjust the quality of the interlacing at the expense of the printing speed.

The interlacing setting can be accessed only on certain printer models in the *Print engine properties* window: in the *Print manager* docker, select the proofer device, then click the *Print engine properties* button (enabled only if the printer is in *Ready* state). Then adjust the *Quality* parameter.

By choosing a higher interlacing quality setting it is likely that the banding will disappear, but the printing speed will decrease. Choosing a lower interlacing quality setting the banding might appear, but the printing speed will increase as well.

It is recommended that the fastest possible interlacing quality setting is chosen, consistent with producing banding free output. (Note that the light ink settings also affect the banding, see *10.4.1 Light inks ‹page 124›*.)

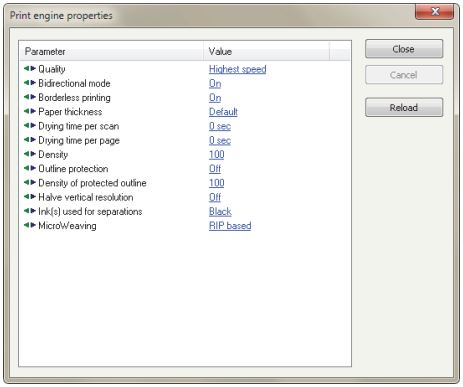
To understand the banding phenomenon, the two major technical problems behind must be identified:

- **nozzle inaccuracy:** each nozzle places the droplet consistently with approximately the same error (i.e. the same distance in the same direction from the required position of the droplet).
- **feed inaccuracy:** (the paper isn't fed by exactly the required amount).

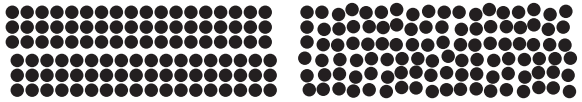
The banding is caused by the fact that compact bands on the paper (typically one or more neighboring rows of pixels) contain pixels with the same placement error (e.g. 5 microns above their required position), and beside it is another narrow band of pixels containing pixels with another placement error (e.g. 3 microns under their required position). The human eye will perceive this as offensive banding. To suppress this banding, a special interlacing technique is used, based on two ideas:

- **Uniform feed:** the most straightforward idea to build the desired resolution (e.g. 1440 × 1440 dpi) with the native head resolution (e.g. 720×180 dpi) is to perform several head passes (16 passes in this example). Before each head pass, the paper is fed and the start position of the head is adjusted by 1/1440 inches. After the 16 passes are done, and a 1 inch wide 1440 × 1440 dpi image is built, the paper is fed by one inch. However, feeding the paper uniformly by the same amount (typically about 1-5 millimeters) will greatly improve the result.
- **One scanline printed by more nozzles:** given the uniform feed technique, each scanline on the paper will have several nozzles aligned during the printing process. Distributing stochastically the pixels of the scanline between the available nozzles will also greatly improve the results.

The explanation of the improved results is that the droplets won't form compactly misaligned groups anymore, but rather will have their own, almost



random, misalignment. The result is a uniform visual noise rather than banding, with a dramatically reduced visual impact.



Printing the same pixel row with more than one nozzle is particularly interesting, because it can improve the quality at the expense of the printing speed: the more nozzles per scanline, the better the result is (usually printing at about half of the maximum possible speed but giving dramatically improved results).

As some proofers use their own algorithms for selecting the different nozzles for the same row, there are quality differences between different proofers with respect to banding. Cascade claims better results than most other proofers when using Epson printers, especially taking into account the availability of the *Quality* setting that can control the number of nozzles per scanline, achieving the best possible result at the expense of slower printing.

10.4.3 Bidirectional mode

Another source of banding and moiré is the bidirectional printing mode (when the head prints in both directions, introducing another source of inaccuracy). Usually printing in bidirectional mode will cause banding or moiré on halftones, so turning it off (if the option is available) might improve the quality.

Certain inkjet printers allow Cascade to control whether the head prints in both directions. Bidirectional printing is almost twice as fast as unidirectional, but introduces another source of inaccuracy in droplet placement, which may cause grainy tints or false moiré on halftones.

The bidirectional mode setting can be accessed (only on certain printer models) in the *Print engine properties* window: in the *Print manager* docker, select the proofer device, and then click the *Print engine properties* button (enabled only if the printer is in *Ready* state). Then adjust the *Bidirectional mode* parameter.

Before turning the bidirectional mode on, a print head alignment procedure is recommended, if available for the printer model. This will minimize the head inaccuracies, calibrating the head placement accuracy.

Most modern inkjet printers have considerably worse droplet placement accuracy in bidirectional mode (though both Epson and Hewlett Packard announced head accuracy improvements for their latest models). Using bidirectional mode, halftone dots of 150-200 lpi line screens are less sharp (visible especially under a magnifier), and without liberal use of light inks, grainy tints or even moiré will almost certainly appear.

Therefore, for the best quality, bidirectional mode is not recommended. However, the speed doubling offered by the bidirectional mode may be attractive, particularly when, with a liberal use of light inks, the quality loss could be almost imperceptible.

10.4.4 Comparison table of settings

Below is a table with the possible quality settings and their effects:

	More light inks	Finer interlacing	Bidirectional mode
Speed problems	·	↑	↓
Horizontal banding	↓	↓	·
Grainy tints	↓	·	↑
False moiré	↓	↓	↑
Greater costs	↑	·	·

Adjusting these values might have serious effects on the printing speed and quality. For example, printing an A3+ proof on an Epson Stylus Pro 4800/7800/9800, using the 1440 × 1440 dpi mode, takes about 6 minutes (in bidirectional mode and with the *Good speed* value in the interlacing setting), but it will take more than 15 minutes in unidirectional mode and the *Normal* value of the interlacing setting.

Similarly, printing without light inks, with the *Highest speed* interlacing quality setting and in bidirectional mode will produce a grainy output with horizontal banding and false moiré. While using abundant light inks, unidirectional mode and the *Normal* interlacing quality setting will produce a perfectly smooth output and visible rosettes.

11 Glossary

- **AM (Amplitude Modulated) screening:** a screening technology which uses dots on fixed positions (a grid), varying their sizes to achieve the desired shades. See *9.3 Understanding digital halftones ‹page 100›*.
- **Bleed:** an extra area of a few millimeters around the page (an extension of the intended design), offering tolerance with the cutting precision, for avoiding a white border at the edge of the page. See *8.6.1 Understanding bleed ‹page 91›*.
- **Calibration:** a procedure which corrects the dot gain or other color distortion of the print engine or the printing process by pre-distorting the printed jobs. The procedure is based on the calibration curve, which describes the transfer curve of the distortion to correct. See *6.4.1 Understanding calibration ‹page 63›*.
- **Capstan:** a simple and cheap technology used by imagesetters and CTPs. Capstan based machines have a fixed laser unit, and the media is slowly moved by the capstan roller during the imaging. The technology has registration and focus problems.
- **Client:** Cascade Client is one of the three executables of the Cascade package. This is the visual interface of the whole system, and can be installed on any workstation in the network. See *2.1 Basic concepts ‹page 13›*.
- **CMYK:** stands for Cyan, Magenta, Yellow and Black – the color space of most printing technologies. The colors are achieved on paper or other media by the subtractive combination of these colors (i.e. the inks filter the light which passes through).
- **Color group style:** a style that stores the names of the colors that a color page contains. See *5.3.3 Composite view ‹page 37›*.
- **Color profiles:** *see ICC/ICM*.
- **Composite:** color pages which have their color components un-separated. A composite job contains color objects (RGB, CMYK or other color models).
- **Contone** (continuous tone): a contone image data describes the image as a continuous variation of the color, as opposed to halftoned data which works with a limited number of colors (usually the pure colors of the colorants), simulating a contone output by halftoning techniques.
- **CTP (Computer to Plate):** a high quality laser printer, printing directly to offset plates, used in the offset industry.
- **Delta E (ΔE):** a formula that defines the difference between two colors, measured in the Lab color space. See *10.1.6 Color accuracy, ΔE ‹page 113›*.
- **Densitometer:** an electronic instrument that is able to measure dot percentages and densities on various media (film, paper or plate). It is used to build the calibration curve and verify accuracy of output.

- **Docker:** a floating child window, which can be docked to a holder. Can be used in either state. Most of Cascade's windows are dockers.
- **Dongle:** *see Hard key.*
- **Dot:** halftone dots or stochastic dots are used by the screening technologies to simulate shades. They are small, solid areas of colorants (ink, toner, emulsion) on the media (typically between 20 microns and tenths of millimeters). Arranged in halftone or stochastic screens, from the right distance are perceived by the human eye as shades of the colorant.
- **Dot for dot (raster) proofing:** a proofing technique that simulates the output based on the ripped (halftoned 1-bit) data, keeping the original halftone dot structure.
- **Drum:** relatively complicated and expensive technology used by imagesetters and CTPs. Drum machines have the laser unit slowly moving on a carriage during the imaging, while the media stays tightened on the drum. The technology offers excellent focus and registration.
- **Fast scan direction:** the direction the laser is sweeping the media, perpendicular to the *Slow scan direction*.
- **Flexography:** a printing technology, typically used in the packaging industry (e.g. plastic bags). Needs a specialized screening due to its special technological requirements.
- **FM (Frequency Modulated) screening:** a screening technology which uses a fixed dot size, varying the density of the dot pattern to achieve the desired shades. See *9.4 Understanding stochastic screening ‹page 103›*.
- **GhostScript:** a PostScript and PDF interpreter, distributed under GPL (GNU) licensing conditions, available also for commercial redistribution from Artifex Software Inc.
- **Gradient:** a continuous change from a color to another. Offering a smooth gradient from black to white is an important technological goal of printing technologies.
- **Gutter:** space between rows or columns of pages in an imposition.
- **Hard key:** a small device attached to the computer, securing against software piracy. Cascade is freely downloadable from the Internet; it is the hard key which protects the program from piracy. Without a hard key attached to the computer, Cascade will run in demo mode. The hard key also holds the license information (i.e. which features of Cascade are enabled), and can be easily upgraded.
- **History:** the database where the Print manager application stores the printed jobs in chronological order, grouped in years, months and days. See *5.6.8 Print manager history ‹page 44›*.
- **Hot folder:** a folder that is monitored by a program for the appearance of new files. In the Cascade system, the Server is watching for PS or PDF files to process (see *3.3 Setting up the hot folders ‹page 25›*), and the Print manager is watching for TIFF files to print (see *7.1.3 Special settings ‹page 75›*).
- **ICC/ICM:** ICM (Image Color Management) is the Microsoft version of the ICC (International Color Consortium) profile. These files describe the color space of one or more devices, and define the way to transform a color from one color space to another. Cascade uses color profiles for the RGB to CMYK conversions. More needs to be said here now.
- **Imagesetter:** a high quality laser printer, printing on photo-sensitive media (film or paper), used in the pre-press industry. The printed films can then be copied to offset plates or used for other printing technologies.
- **Imposition:** a procedure of arranging pages for printing, typically two or more pages on a sheet, which then will be folded and/or cut.
- **In-rip separation:** the process when the RIP is performing the color separation (typically producing the four – C, M, Y and K – plates from a composite job).
- **JDF:** an industry standard designed to simplify information exchange between different applications and systems in and around the graphic arts industry. Cascade uses JDF to transfer ink duct control information to the printing press. See *5.4.2 Ink duct control ‹page 39›*.
- **Job browser:** the most important docker of the Cascade Client, managing the job list, and allowing operations like previewing, deleting or moving the job, sending it for printing, etc. See *4.5.1 Job browser ‹page 31›*.
- **Job style:** specifies how a job will be processed (printer profile, screen frequency, dot size, geometry, in-rip separations etc.). Job styles can be saved, and then applied to jobs in many ways. See *6.2.1 Job styles manager ‹page 51›*.
- **Line screen ‹1›:** the number of halftone dots per unit, measured in lpi (lines per inch) or lpc (lines per centimeter). A 150 lpi screen has 150 halftone dots on 1 inch.
- **Line screen ‹2›:** Cascade line screens are combinations of angle approximations intended to produce together consistent rosettes. Can be used for printing only through its child *Dots*.
- **Media saving:** maximizes media use and minimizes wastage by rotating, collecting and arranging the output pages. It can also increase the throughput speed of drum machines. See *6.1.2 Printer profile properties dialog box ‹page 46›*.

- **Mirror:** the offset technology requires the job to be printed mirrored. Mirrored jobs are also called as *Wrong reading*, while normal jobs as *Right reading*.
- **Moiré:** interference between repetitive patterns, causing a disturbing pattern. In the printing industry typically the halftone screen is causing moiré, interfering with a raster device, image elements or with each other. See *9.2 Understanding moiré ‹page 98›*.
- **NT system service:** a special way of running programs, available in NT based operating systems (e.g. Windows XP, Windows 2003 Server). Programs running as system services are launched before any user logons, and can be started and stopped by the *Services* administrative tool. Cascade Server and Print manager can run as system services, see *Step 12* of section *2.2.8 Installing Cascade ‹page 16›*.
- **Overprint:** a technique to avoid thin white lines around design elements, caused by imperfect registration. Typically small black texts are printed over the background, without erasing the colors under the texts as it normally should happen.
- **PDF (Portable Document Format):** a document format, created by Adobe Systems Incorporated, which became now a standard in the printing industry, as well as in home and office use. Gained popularity by portability, small document size, flexibility and by the fact that the Acrobat Reader is freeware.
- **Physical pages on sheet:** the number of pages which will be physically printed on the imposition sheet.
- **Platesetter:** *see CTP*.
- **PostScript (PS):** a page description language, created by Adobe Systems Incorporated in the 1980's, which became now a standard in the printing industry. Usually design or general use applications create PostScript data, which is then interpreted by the RIP of a printer, imagesetter or CTP.
- **PPD (PostScript Printer Description):** a text file that describes a PostScript printer, used by the PostScript drivers.
- **Preflight warning:** if Cascade detects potential problems about a job, it will warn the user by placing an exclamation sign in the job's icon, on yellow or red background. The description of the warning is also available to the user. See *5.2.3 Preflight warnings ‹page 35›*.
- **Print manager:** Cascade Print manager is one of the three executables of the Cascade package. It is the interface between the Cascade system and the print engine. See *2.1 Basic concepts ‹page 13›*.
- **Printer profile:** a virtual representation of a print engine with one resolution and one media size. A physical print engine has one or more corresponding printer profiles in the Cascade system. See *6.1 Printer profiles ‹page 45›*.
- **Process color:** color that is obtained by the use of the four standard inks (CMYK).
- **Proofer:** a system (typically software and an inkjet printer) that simulates the output of a printing press or another printing device
- **Remote Desktop:** a remote visualization system by Microsoft. A small client program can connect to a Windows XP or Windows 2003 Server user account remotely, through the network, from PC or Mac workstations.
- **Rendering intent:** color conversion strategy. Due to the fact that a range of RGB colors are out of the CMYK color space (gamut), these strategies describe how to convert these colors, and eventually their neighbors. The strategies that Cascade uses are standard, and are widely available on the web (e.g. *http://www.color.org/profile.html*).
- **RGB:** stands for Red, Green, Blue – the color space of most displays. The colors are achieved by the additive combination of these colors.
- **Right reading:** see Mirror.
- **RIP (Raster Image Processor):** a software and/or hardware equipment which translates page description languages (typically PostScript) to raster bitmap data. It may also offer previewing, imposition, job management and other features.
- **Rosette:** a flower-like pattern, produced by the interfering halftone screens (typically cyan, magenta and black). A rosette is consistent if the same pattern is kept on the whole print area, without shifts or moirés.
- **Saddle-stitching:** is used for publications with few pages (usually not more than 32 pages). The pages are collected, stitched on the saddle, and then folded on the saddle. See *8.3.3 Binding tab ‹page 86›*.
- **Screen manager:** manages the line screens and dots of the profiles. See section *9.7.1 AM settings tab ‹page 107›*.
- **Screening:** a technology used by most print technologies to simulate shades of their colorants. AM (traditional) and FM (stochastic) screenings are the two basic screening technologies. Hybrid screenings are combinations of the two technologies.
- **Separations:** grayscale pages, which are the separated color components of one color page. For example, process color pages are the combination of four separations: cyan, magenta, yellow and black. A pre-separated job contains the separations as independent grayscale pages (i.e. 4 pages for a process color page).
- **Server:** Cascade Server is one of the three executables of the Cascade

package. This is the 'brain' of the system. It has a minimal user interface, and appears as an icon in the system tray. See *2.1 Basic concepts ‹page 13›*.

- **Sheet cycle:** the number of *signatures* (sheets with different imposition scheme) in a job. This is typically one (for single-sided work) or two (for sheetwise work). See *8.4 Manual imposition ‹page 88›*.
- **Sheet:** in the imposition terminology means an imposition page.
- **Sheetwise:** double sided (both sides of the sheet will be printed, with different plates).
- **Signature:** in the imposition terminology means an imposition scheme, which may be repeated over several imposition sheets.
- **Slow scan direction:** the direction the media (capstan) or the carriage (drum) is moving. It is perpendicular to the *Fast scan direction*. Do not confuse it with the feed direction (in case of the drum machines, they are perpendicular).
- **Spectrophotometer:** an accurate instrument that measures color across the visible spectrum and produces data describing the color of a given sample in terms of various parameters (typically Lab or XYZ values).
- **Spot colors:** colors that are obtained by the use of one special ink (e.g. orange) instead of combining process colors (e.g. magenta and then yellow).
- **Stochastic screening:** see *FM screening*.
- **Cascade port:** a virtual port created by Cascade, which acts like an LPT or USB port. Cascade Server captures all the data written to this port.
- **StyleXP:** a small program for using skins (e.g. Mac-style controls) on a Windows XP or Windows 2003 Server operating system.
- **Supply cassette:** the cassette the roll fed machine is fed from.
- **System service:** see *NT system service*.
- **Take-up cassette:** used only with imagesetters – a cassette that receives and stores the imaged, but still light-sensitive, film, until the film is pulled out to be processed.
- **TIFF (Tagged Image File Format):** a flexible bitmap format, created by Aldus Corporation in 1986, which has become a standard in the printing industry. Gained popularity due to its flexibility.
- **TIFF catcher:** an application that is able to print TIFF files on a specific print engine (typically CTPs), by exposing a hot folder where RIPs can drop the processed TIFF files.
- **Traditional halftones:** see AM screening.
- **Trapping:** a technique to avoid thin white lines around design elements, caused by imperfect registration, when overprint is not possible (e.g. red object on green background). A thin overlapping border is used between the object and the background, giving a tolerance with the registration errors. Trapping can be created manually (by the designer), by the design application, or by the RIP (in-RIP trapping).
- **Video mode:** a common term for the *Mirror* and *Negative* options, and their possible combinations.
- **Work style**: the work style describes the way the sheet is fed back into the print machine (if it is). There are the following options: Single sided, Sheetwise, Work and turn, Work and tumble. See *8.3.3 Binding tab ‹page 86›*.
- **Wrong reading:** *see Mirror.*